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# USSR Report

SCIENCE AND TECHNOLOGY POLICY



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1 July 1985

**USSR REPORT  
SCIENCE AND TECHNOLOGY POLICY**

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ORGANIZATION, PLANNING AND COORDINATION

ACADEMICIAN PATON ON UKRAINIAN COMPREHENSIVE PROGRAM OF PROGRESS

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 2, Feb 85 pp 92-95

[Report on speech of President of the Ukrainian SSR Academy of Sciences Academician B. Ye. Paton at 2 October 1984 meeting of the Scientific Council for Problems of Scientific, Technical and Socioeconomic Forecasting attached to the Presidium of the Ukrainian SSR Academy of Sciences, by P. Popov: "The Urgent Problems of the Formulation of the Republic Comprehensive Program of Scientific and Technical Progress and Its Socioeconomic Consequences for the Period to 2010"]

[Text] The regular meeting of the Scientific Council for Problems of Scientific, Technical and Socioeconomic Forecasting attached to the Presidium of the Ukrainian SSR Academy of Sciences and the Ukrainian SSR State Planning Committee was held in Kiev on 2 October 1984. Deputy Chairman of the Ukrainian SSR Council of Ministers S. I. Gurenko, G. I. Pal'shin, chief of a sector of the Science and Education Institutions Department of the Ukrainian CP Central Committee, executives of republic ministries and departments, who are members of the council, the vice presidents and academician secretaries of the departments of the Ukrainian SSR Academy of Sciences took part in the meeting.

At the meeting President of the Ukrainian SSR Academy of Sciences Academician B. Ye. Paton, chairman of the scientific council, delivered the report "On the Tasks of the Scientific Council With Respect to the Formulation of the Comprehensive Program of Scientific and Technical Progress and Its Socioeconomic Consequences for 1991-2010 for the Ukrainian SSR." In the report it is emphasized that scientific and technical progress is playing a decisive role in the accomplishment of the strategic tasks of the intensification of the socialist economy. Under the conditions of the planned management of the economy it is becoming a mighty factor of the progressive development of the production potential and the increase of the well-being of the people. The scientifically sound determination of the prospects of scientific and technical progress and, on this basis, the prospects of the development of the economy as a whole is of especially great importance. Such an approach follows from the decisions of the 26th CPSU Congress, the subsequent CPSU Central Committee plenums and the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy."

New possibilities for the increase of the influence of scientific and technical progress on socioeconomic development were envisaged by the decree of the CPSU Central Committee and the Ukrainian SSR Council of Ministers of 12 July 1979, "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" [as published]. In conformity with this decree comprehensive programs of scientific and technical progress for the next 20 years are being formulated in our country and in each union republic. At the meeting of the Commission of the CPSU Central Committee for the Preparation of a New Version of the Party Program, which was held in April 1984, General Secretary of the CPSU Central Committee K. U. Chernenko stressed the importance of the comprehensive program of scientific and technical progress for the scientific substantiation of a number of provisions of the Party Program.

Further the speaker dwelt on the importance of comprehensive programs of scientific and technical progress and the tasks on the improvement of their formulation. It was noted that the comprehensive programs of scientific and technical progress are called upon to specify in the form of a preplanning document the possibilities of scientific and technical progress and its socioeconomic consequences. On the other hand, these programs are the basis for the drafting of plans of the development and distribution of productive forces, as well as plans of economic and social development. Moreover, the republic comprehensive program is included as a regional section in the union program, determining thereby the prospects of the development of the economy of the republic in the system of the national economic complex of the country. The comprehensive programs are also of no less great importance for the development of science itself. First, the prospects of the improvement of the scientific potential are incorporated in them. Second, they are nothing other than another "outlet to practice" of all scientific developments without exception. During the compiling of the programs science receives the opportunity to systematize its achievements from the point of view of the strategy of economic development. Every scientific collective owing to the comprehensive program can show the importance of its developments for related fields of science and technology, the sectors of the national economy and the economy as a whole. Precisely for this reason the comprehensive programs should be regarded as an important measure of the acceleration of scientific, technical and social progress.

The comprehensive program, it is stressed in the report, can perform these functions only in case of the fulfillment of the two most important and closely interconnected conditions: in case of the increase of its scientific and technical level and the improvement of its use in planning practice.

At the same time the gained experience of formulating comprehensive programs attests to the existence of a number of shortcomings and unsolved problems. First of all, the sufficiently complete consideration of scientific achievements, especially the possibilities of new technology, is still not ensured in the comprehensive program. In many instances the sections of the program continue to be oriented toward the predominant use of available technical solutions, and not toward the elaboration of fundamentally new ones. The consideration of resource limitations, the effect of which in the national economy of the republic will, as is known, increase, is also an important

question. On this level the comprehensive plan is called upon to specify the means of the intensification of the national economy, first of all by the leading introduction of the most efficient resource-saving technologies. So that the program would satisfy these requirements, when formulating it variant calculations, which would be of a "comprehensive nature," that is, would take into account the resource limitations, as well as the increasing possibilities of science and technology, should have the most extensive use. In the prevailing comprehensive program the variant calculations have been made for far from all sectors, while the ones that do exist do not always give a clear idea of the alternate possibilities of development. Without the making of variant calculations it is impossible to prepare a program which would satisfy present requirements.

It is also noted that the inadequate substantiation of measures on the improvement of the economic mechanism is among the shortcomings of the prevailing comprehensive program. A number of questions of the improvement of management and planning belong to the competence of union organs and the union program. However, as experience shows, there is much than can be done at the level of the republic, in ministries and departments. This applies first of all to the set of indicators of planning and the evaluation of economic activity, the stimulation of high end results. The comprehensive program, which is a component of the improvement of the economic mechanism and the acceleration of scientific and technical progress, should become information of the corresponding measures in sectors, regions and the national economy as a whole.

Further the speaker dwelt on questions which are connected with the participation of the State Planning Committee, ministries and departments in the work on the comprehensive program. The most significant reserves of the improvement of the use of the program in economic planning practice are incorporated in this participation, more precisely in its all-round development and expansion. Every problem commission of the scientific council should find among the workers of the State Planning Committee, ministries and departments of the republic not only experts, but also immediate participants in the work. This will make it possible to unite scientific foresight more closely with direct economic experience.

The experience of preparing comprehensive programs also attests to the need for the more thorough elaboration of the questions of the development of the base sectors of the national economy of the republic. First of all there are meant ferrous metallurgy, the work of which in the immediate future should be reorganized on the basis of the assurance of mainly qualitative growth; machine building, in which it is very important to specify clear prospects of specialization and the establishment of more efficient intersectorial relations. It is also necessary to emphasize the problems of the development of the Donbass, the need for the solution of which in the immediate future is assuming particular urgency. The socioeconomic consequences of the realization of the largest national economic projects, such as the Danube-Dnieper water management complex, the performance of large-scale drainage reclamation operations in the Polesye, the development of atomic energy and others, also require thorough analysis.

The practice of formulating the regional sections of the comprehensive program, which are prepared by the scientific centers of the Ukrainian SSR Academy of Sciences, also requires further improvement. Here it is necessary to bear in mind that the effective promotion of the optimum combination of sectorial and territorial interests and the elimination of so-called departmental barriers are one of the main tasks of the scientific centers as the main unit of the territorial management of scientific and technical progress, which operates in the republic. As a rule, these barriers appear most acutely when solving the problems, which are connected with the efficient use of natural, manpower and material resources, as well as are oriented toward the meeting of the need of the national economy as a whole. For example, for the Donbass and the Dnieper River region these are the improvement of the ecological situation and the systematic changeover of the material base of construction to the maximum use of raw materials made from waste products and byproducts, for the Southern Region--the complete use of the resources of Sivash, for the western oblasts of the republic--the development of the recreational complex in the Carpathians and others. But these and several other problems, which are regional in their nature, but are very important both for the republic and for the country as a whole, were inadequately elaborated in the comprehensive program for the period to 2005. It is necessary to eliminate this substantial shortcoming. It is necessary to devote the closest attention to the problems mentioned above. The prospects of their solution for the period being forecast should be determined, the possible negative consequences of disregarding these problems should be shown. The planning commissions of the corresponding oblast soviet executive committees should also be enlisted more actively in this work and should be included among the organizations which are the performers of the regional sections.

In analyzing the problems of forecasting the development of science and the scientific potential within the comprehensive program, the speaker noted that during this work the evaluations of the relative importance of various scientific and technical trends from the point of view of the possible socioeconomic consequences of their realization should constantly be renewed; new vital trends or arising problems should also be taken into account in good time. First of all, the basic and applied scientific trends, with respect to which the scientists of the republic hold a leading place, should find dominant development and support. The forecast in this case should take into account without fail the existence of original ideas and specific experience in order to pose in a well-founded manner the question of the development of work in some directions or others. This makes it possible to distinguish in each case especially promising or priority trends. Here it is also necessary to indicate the trends, which lose urgency in the future as a consequence of the appearance of some alternate approaches to the solution of the initial problems, or as a consequence of the change of the very structure and content of the problems.

A number of important scientific methods and organizational measures should also contribute to the accomplishment of the tasks on the increase of the scientific substantiation of forecasts and the improvement of their use in practice. First, the formation in the structure of the leading scientific institutions of groups of specialists, which organize forecasting studies in

various fields of knowledge and technical development, as well as the accomplishment of the scientific generalization of the obtained results, is justified. Such groups already exist and are working actively at the institutes of cybernetics, electric welding, superhard materials, problems of casting, problems of material science and a number of others. The effectiveness of their activity appears in the increase of the procedural level of forecasting studies and the substantial saving of the time of leading scientists. Second, serious attention should be devoted to the use in practice of modern professional scientific methods of forecasting. Along with the methods of expert appraisals and actively developing mathematical information modeling, the analysis and recording of patent and license data merit more extensive use. The analysis of trade and market information is of particular importance for foreseeing real structural shifts in the production and use of modern science-intensive products. Third, the organization of the special information support of scientific, technical and socioeconomic forecasts should be improved decisively.

The comprehensive program, it is noted in the report, should provide the prerequisites so that the republic, sectorial and regional programs, which are interconnected with each other and with the state plans, in practice would be a system. Precisely as a result of this it should contain a long-term concept of scientific and technical progress in the republic, which is common to all the programs and plans, data on the matching of the versions of the goals and the means of their achievement, as well as estimates of the resources which are necessary for the subsequent implementation of the goal programs and plans. A source of the potentially enormous effectiveness of the comprehensive program lies in this.

In conclusion the speaker dwelt on the organization of the work on formulating the Comprehensive Program of Scientific and Technical Progress and Its Socioeconomic Consequences for 1991-2010 for the Ukrainian SSR. Here the problem commissions of the scientific council, which leading scientists of the republic and management personnel of ministries and departments head, will be the main organizational unit. The composition of the performers of the program has also been strengthened significantly, their total number has increased by more than a third. By now significantly more scientific institutions of the Academy of Sciences, the republic State Planning Commission and the Southern Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, many higher educational institutions, more than 100 scientific research and planning and design organizations of ministries and departments and officials of the Ukrainian SSR State Planning Committee have been enlisted in the preparation of the program. The work of this large collective of scientists and specialists should be efficiently organized. An important role in this belongs to the main organizations for individual sections of the comprehensive program. Whereas the elaboration of individual directions of scientific and technical progress in the sectors is the basic assignment of the coperforming organizations, the main organization should generalize them, giving a clear description of the level and prospects of development. It is very important to set rationally the tasks for the coperformers and to give their work scientific methods support. Here it is necessary to proceed from the fact that the comprehensive program will be regarded as one of the basic results of the activity of all the main

organizations on its formulation. With respect to the coperforming organizations, they should include the work on the preparation of the assigned sections in the thematic plan and ensure the high quality of forecasting studies.

It is necessary to organize the preparation of the comprehensive program for the period to 2010 as the common creative labor of all the participants interested in it. Here the Council for the Study of Productive Forces of the Ukrainian SSR attached to the Ukrainian SSR Academy of Sciences--the main organization for the formulation of the program--along with the improvement of scientific methods support should display greater demandingness on the quality of the materials, which are prepared by the coperformers, and should organize the unconditional fulfillment of the approved schedule of operations. The formulation of an earlier version of the sections of the program will be one of the first and very important stages of the work. It is necessary already at this stage to obtain all the basic results of research, which distinguish the new program from the previous one, scientifically sound concepts of the development of the sectors of the national economy and the socioeconomic consequences of scientific and technical progress.

During the discussion of the report the members of the scientific council, who spoke at the meeting, made a number of specific suggestions with respect to the improvement of the practice of formulating the comprehensive program. Ukrainian SSR Minister of the Coal Industry M. K. Grin'ko, a member of the bureau of the scientific council, dwelt on the questions connected with coal mining in the Donbass and stressed the importance of the comprehensive elaboration of the prospects of its development in the unified system of the national economic complex of the country. Deputy Chairman of the Ukrainian SSR State Planning Committee G. V. Dzis', director of the Problem Commission of the Scientific Council "Scientific and Technical Progress in the Production of Consumer Goods and Services," informed the council members about the work being performed on the determination of the prospects of the development of consumer goods production in the republic and the improvement of the operation of the consumer service sectors. A number of suggestions with respect to the conducting within the framework of the formulation of the program of comprehensive studies of the socioeconomic consequences of scientific and technical progress were also expressed. Urgent questions of the improvement of the forecasting of the development of the sectors of the agroindustrial complex on the basis of the achievements of scientific and technical progress were raised in the statement of Academician of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin G. O. Bogdanov, deputy chairman of the scientific council and chairman of the Presidium of the Southern Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin. The important role of agricultural science in this work was noted. The tasks on the improvement of the organization of the formulation of the comprehensive program and the improvement of the scientific methods principles of forecasting were presented in the statement of Candidate of Economic Sciences S. I. Doroguntsov, deputy chairman of the scientific council and acting chairman of the Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences. In conclusion Doctor of Economic Sciences Professor Yu. P. Lebedinskiy, scientific secretary of the scientific council and deputy chairman for scientific work of the Council for

the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences, gave reports on the plan of the work of the scientific council for the next period.

At the meeting a detailed decision of the scientific council on the issues being discussed, which envisages specific steps which are aimed at the accomplishment of the tasks posed for the council, was adopted.

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ORGANIZATION, PLANNING AND COORDINATION

CONTRIBUTION OF UKRAINIAN SCIENTISTS TO SCIENTIFIC AND TECHNOLOGICAL PROGRESS

Kiev PRAVDA UKRAINY in Russian 31 Mar 85 pp 1-2

[Article by Ukrainian News Agency: "Toward the Front Lines of Scientific and Technological Progress"]

[Text] With each year, the contribution of Ukrainian scientists is growing in the area of development of Soviet science, solving the most important problems of intensification of the economy, enrichment of the spiritual potential of our society. Quite a few new effective forms of strengthening ties with industry were generated and there was faster introduction of the results of research to national economic practice through their efforts.

The results of scientific research in the period under review and tasks that must be performed in the last year of the five-year plan, future directions of basic and applied research were discussed at the General Meeting of the Ukrainian Academy of Sciences, which convened in Kiev.

The presidium of this meeting consisted of the following: V. V. SHCHERBITSKIY, member of the Politburo of the CPSU Central Committee and first secretary of the Central Committee of the Ukrainian Communist party; members of the Politburo of the Central Committee of the Ukrainian Communist Party--A. P. LYASHKO, chairman of the Ukrainian Council of Ministers, A. A. TITARENKO, second secretary of the Central Committee CPUk, A. S. KAPTO, candidate member of the Politburo and secretary of the Central Committee CPUk, S. I. GURENKO, deputy chairman of the Ukrainian Council of Ministers, V. M. KUDINOV, deputy chairman of the USSR State Committee for Science and Technology, F. M. RUDICH, chief of Department of Science and Educational Institutions of Central Committee CPUk, members of the presidium of the Ukrainian Academy of Sciences, administrators of several ministries and agencies.

B. YE. PATON, president of the Ukrainian Academy of Sciences, delivered a report. A. P. LYASHKO, member of the Politburo of the Central Committee CPUk and chairman of the Ukrainian Council of Ministers gave a speech.

Speech of Comrade A. P. LYASHKO

Honored comrades! Our country is preparing for the 27th Congress of Lenin's party in an atmosphere of a strong rise in political and labor activity. The workers of the Ukraine, like the entire Soviet people, learned with satisfaction

about the programs and basic orientation of the special March Plenum of the CPSU Central Committee, which confirmed the continuity of the party's strategic course. They warmly approved the election of a prominent party and state figure, comrade M. S. Gorbachev as general secretary, of the CPSU Central Committee. Unanimous in their support of the party's domestic and foreign policies, the workers, kolkhoz farmers, intelligentsia and all those who labor are full of determination to augment the power of their homeland, to fulfill the tasks for this year and the five-year plan as a whole.

The Soviet Ukraine, which is in step with the nation in its work, is advancing confidently to new frontiers. In this respect, the last few years were particularly fruitful: there was substantial acceleration of development of social production, its efficiency increased and quality indicators improved appreciably. National income increased by 4.3% last year and by 18.9% in 4 years, which is considerably more than indicated in the five-year plan. Virtually all of the increase was achieved by augmenting labor productivity. The social program of the five-year plan is being implemented well. This republic's scientists are making an increasing contribution to achievement of positive results. At the present time, when the efforts of the party and people are directed primarily on completing the change in the economy to the route of intensification, the role of science, of scientific and technological progress as the basis of this process, is growing immeasurably.

It was stated in the speech that the Central Committee CPUk and Ukrainian Council of Ministers devote unwavering attention to accelerated development of science and technology, and to broad introduction of their achievements to industry. In recent years, a definite system of control of scientific and technological progress has become established in this republic. Work on organizing fulfillment of plans for development of science and technology, formation of scientific-technical programs in sectors of the national economy and in the intersector aspect is coordinated by the Commission for Scientific and Technological Progress of the Presidium of the Ukrainian Council of Ministers, and there is control of their implementation. With the establishment of the Council for Cooperation in Scientific and Technological Progress under the Central Committee CPUk, which is headed by comrade V. V. Shcherbitskiy, as well as analogous councils under oblast, city and rayon party committees, the work of all links in the science-industry chain acquired much purpose and specificity.

The steps taken to accelerate scientific and technological progress are yielding positive results. In 4 years, 9500 mechanized flow and automatic lines were put in operation, about 11,000 installations were submitted to combined mechanization and automation, more than 4000 robotic devices were introduced in this republic. The basic tasks in the six republic-level combined programs, as well as most of the sectorial and regional scientific-technological programs are being successfully fulfilled.

This republic's Academy of Sciences is on the forward edge of scientific and technological progress. It has firmly taken a leading position in Soviet and worldwide science in several important scientific directions. The talented team of academy scientists and administration deserve much credit for this.

Having dwelled on the problems that are acquiring increasing significance to the national economy, A. P. Lyashko stressed that optimum use of all types of resources, all elements making up national production, is the most important direction of scientific-technological progress, a mandatory condition for intensification of the economy. Problems of speedy retooling of all sectors of the national economy, improvement of quality and consumer properties of products, development and assimilation of the most progressive technologies that would provide for integrated processing of raw materials, make it possible to eliminate industrial waste or reduce it to a minimum are growing increasingly pressing. Efforts must be increased in this matter. Here, we need genuinely revolutionary solutions based on the results of basic research.

Use of secondary resources formed in different sectors of the economy at the present level of technology is an important factor in improving financial security of industry. They constitute almost 12% of the total volume of raw materials used in the republic. In 4 years of the current five-year plan, 13.5 billion rubles worth of products have been put out. Still, a large part of the waste is still lost. Academy institutes could provide serious assistance in the search for new and more effective means of returning secondary resources to industry. The creative collaboration of the Academy of Sciences, Ukrainian State Committee for Material and Technical Supply and sector ministries must be expanded as much as possible.

The attention of scientists was also called to the fact that, along with development of new substances and materials--polymers, compositions, metal-containing polymers and cermet high-impact alloys and others--one should develop procedures and technology for recycling them, restoring them after they wear out, search for the possibility of reusing these products in some capacity or other.

Among the pressing problems of conservation of resources, it was stated in the speech, questions of saving fuel and energy resources hold a special place. Use of existing resources is related primarily to development and introduction of new methods of transforming energy, progressive technologies that would cause a drastic reduction in energy consumption of production. The intentions of the Academy of Sciences to activate its efforts in this important matter can only be welcomed. And this problem should be in the field of vision not only of energy-related institutes, but others working on development of new technological processes and machinery for different sectors of the national economy.

One of the promising means of conserving traditional power resources is to use renewable sources of energy--radiant energy of the sun, heat deep in the earth, energy of the wind and others. Academy institutes dealing with problems of materials technology, engineering thermophysics and problems of machine building are working on these issues in this republic. Such work is being done on a broad scale at the Kiev Polytechnical Institute. It is high time to broaden work on using renewable energy sources in industry. Different sectors and agencies should join forces, and there must be faster change from development of individual experimental units to important practical

recommendations and introductions. The Academy of Sciences could take on the job of coordinating such scientific research in this republic, intensify collaboration in this field with institutes of the USSR Academy of Sciences and academies of Union republics.

It was stated in the speech that academy scientific teams have much to do in order to solve problems, on which depends successful fulfillment of the Food Program. Special attention should be given to problems of land reclamation. Further development of irrigation in the southern part of this republic is being delayed, even now, due to the limited water resources. Considering the seriousness of the existing situation, it was decided to build the Dnepr-Bug river hydrosystem in 1986-1995 and the first line of the Dunay-Dnepr canal in 1990-2000. These are very large plans. Their implementation is necessary to assure stability of agriculture. For this reason, plans should be backed up by in-depth and integrated scientific research. We cannot manage without the broad involvement of academy institutes, sectorial scientific institutions and VUZ's, without their coordinated research. And there can be no delay, since blueprints are already being drafted for the span over the Dnepr-Bug river valley and construction of the hydrosystem. This republic's Council of Ministers recently reviewed these matters and demanded that the Ministry of Land Reclamation and Water Resources, other ministries and agencies, as well as the Academy of Sciences, work very thoroughly and in-depth on all aspects of developing these hydraulic engineering installations.

A. P. Lyashko further stated that the key problem of scientific and technological progress is introduction of results of scientific research to practice in the national economy. Its solution is related primarily to elaboration of a reliable mechanism of interest on all parts in using the achievements of science and technology. The republic's Academy of Sciences has accumulated quite a few interesting data on organization of interaction between science and industry. Many of its scientific teams skillfully combine depth of basic research with obtaining practical results, primarily in the form of efficient technological developments. At the same time, advancement of scientific developments into industry is sometimes delayed to such an extent that some of them become obsolete without ever yielding an actual economic benefit. Quite a few completed projects are being introduced at only one or two enterprises. Primarily some ministries and agencies are to blame for this, as they display insufficient initiative and are not always willing to introduce innovative, progressive developments.

Another equally important reason for the existing situation is considered to be the fact that researchers sometimes stop when they are half through, without bringing their ideas and started projects up to the level of readiness that is acceptable for extensive introduction. Consider, for example, such a pressing task as investigation of the geological and mining status of coal beds and rock of the Donets Basin at great depths after they have been mined. Along with sector institutes of the Ministry of the Coal Industry, solid research in this direction is being pursued by the Academy's Institute of Geophysics imeni S. I. Subbotin, Geotechnical Institute and Donetsk Physicotechnical Institute. At the same time, many of these investigations are not carried out to the point of practical use.

**Reliable theory of coal, rock and gas blow-out has not yet been advanced, nor is there one for forecasting changes in temperature, which would permit finding effective methods of working on coal beds that present a blow-out hazard. The scientists in the Department of Earth Sciences must solve this problem as soon as possible.**

The speaker noted that the sometimes inadequate level of readiness of scientific developments is apparently attributable also to poor development of an important connecting link in the science-industry chain, a link, in which there is merging, so to speak, of interests and efforts of all individuals involved in introduction--scientists, designers, planners and producers. The engineering centers are called upon to strengthen expressly this link. The work of the Ukrainian Academy of Sciences to organize these centers at the leading scientific-technological complexes has been rated well by the Central Committee CPUk. The republic's government is outlining steps to disseminate the academy's knowhow in this area, solve a number of practical problems related to assuring a high degree of efficiency in the work of the engineering centers. They must take into consideration to the utmost extent the needs of industry, they should elaborate more thoroughly and economically engineering projects. Management of ministries, agencies and enterprises must make full use of the opportunities offered by the engineering centers for faster introduction of new, progressive equipment and technology, and render all possible assistance to them.

Social sciences must make a substantial contribution to acceleration of scientific and technological progress. Scientific and technological progress is a process of proper transformation of productive forces, and this depends directly on improvement of the system of social, primarily industrial, relations. The solution to this problem requires raising the level of social-science studies, investigation of actual socioeconomic trends that reflect the patterns of further development of socialism. It is particularly important to analyze comprehensively the interaction of all the basic factors determining scientific and technological progress--economic and political, social and legal, ethical and psychological. To investigate this sort of problem, social scientists must increase substantially the share of applied projects. The presidium of the Academy of Sciences has made a step in this direction, having established a department of sociology at the Institute of Philosophy. It is important for this department to become the initiator of combined applied investigations.

It was stressed in the speech that a greater impact of scientific endeavor, perhaps like no other, depends on the level of qualifications and training of personnel. The main prerequisite for success in science is referable to its creative people, their professional, political and ethical standards. Much was and is being done to train worthy scientific replacements by comrades B. Ye. Paton, B. I. Verkin, A. S. Davydov, Yu. K. Delimarskiy, A. V. Kirsanov, P. G. Kostyuk, Yu. A. Mitropol'skiy, A. F. Prihot'ko and others.

The knowledge and experience of scientists is the most valuable capital, which, however, you cannot deposit in a bank or preserve as a treasure. Even the expression in solid publications, at the current rapid pace of development of science, will not spare it from obsolescence and gradual devaluation. The

only possible interest on this capital are our young replacements, who will assimilate and develop it, assuring it a long life and multiplying the glory of the founder.

At the same time, the party organizations and administration of by far not all academic institutions devote due attention to creative growth of young people, as validly indicated by comrade V. V. Shcherbitskiy on 25 March at the Plenum of the Central Committee CPUk. One must see to it that each major researcher be concerned with development of new talented people who would continue his ideas. This must become a mandatory criterion in assessing all of a scientist's work, his party-mindedness and citizenship.

In conclusion, on behalf of the Central Committee of the CPUk and government of the republic, A. P. Lyashko voiced his confidence in the fact that scientific groups and all workers at the Academy of Sciences will do everything that depends on them for successful fulfillment of the tasks of the 11th Five-Year Plan, will make a worthy contribution to further acceleration of scientific and technical progress, comprehensive intensification of the nation's economy and will greet the 27th CPSU Congress with new creative achievements.

\* \* \*

Academician B. YE. PATON, president of the Ukrainian Academy of Sciences, who analyzed in his paper the performance of scientists, observed that workers in Soviet science, one of the detachments of which is the Ukrainian Academy of Sciences, have made a considerable creative contribution to the achievements of the Soviet people in implementing the decisions of the 26th Party Congress, subsequent plenums of the CPSU Central Committee, targets of the 11th Five-Year Plan, in strengthening the economic and defense might of our country and improving welfare of the people.

Convincing data were submitted indicative of the broad range of basic and applied research, its improved effectiveness and quality, growth of the academy's influence on scientific and technological policies in different sectors of the nation's economy. Last year, about 1700 developments were introduced to the national economy, yielding an overall economic effect of more than 1.1 billion rubles, of which the academy's share constituted over 630 million. In this time, its scientists received 2236 author certificates for inventions and 23 licenses were sold in foreign countries. This is considerably more than in the preceding year. Four employees of the Academy of Sciences received the Lenin prize and 64, USSR and UkrSSR State Prizes.

Establishment of engineering centers in the system of the Ukrainian Academy of Sciences is a new and highly effective form of contact between science and industry. There was continued expansion and strengthening of creative ties with the USSR Academy of Sciences, republic and sectorial academies. Ukrainian scientists participated actively in fulfilling several international scientific programs.

The paper reflected the multilevel panorama of innovative research, which is being pursued in many branches of science. In particular, the achievements

of mathematicians, who expounded for the first time in the world theory of multifrequency waves, is of major significance. The mathematical models and algorithms developed on its basis have found broad applications in natural science and engineering. Cyberneticists made a major step in development of Soviet computer hardware; they have completed work on development of a unique multiprocessor complex referable to the supercomputer class. This complex, which makes it possible to improve substantially the quality of solving complicated scientific-technical and national economic problems, has already been approved by the state commission and recommended for series production. Interesting results were obtained in studies to develop experimental systems of artificial intelligence.

Among the latest achievements of physicists, there was mention of the discovery of a previously unknown property of semiconductor crystals, which opens the way for development of sophisticated measuring equipment. Radioastronomers are succeeding in studying a number of objects in the universe using modern equipment and new methods. Scientists of the Ukrainian Academy of Sciences have become active participants in the Soviet program for earth-based observations of Halley's comet.

Results of basic research in the field of materials technology are being introduced to practice with a great effect. Thus, on the basis of investigation of the nature of automatic vacuum welding of metals under pressure, a basically new technology was developed for recovery of quasisheet metal by means of hot rolling of multilayered bars. Chemists are to be credited for new and effective catalysts for industrial production of acids and other compounds, as well as for processes of reduction of a number of substances, purification of gases and other valuable innovations. Biologists succeeded in identifying the mechanisms of processes that take place in biological membranes. The results of studies in the area of cell and gene engineering served as the basis for developing biotechnologies for recovery of base material in breeding new agricultural cultivars.

Last year, many studies were also conducted in the area of wise use of natural resources and environmental protection. Attention was focused mainly on development and introduction of technologies with little waste that conserve resources and energy, as well as on combined use of industrial waste.

The president of the Ukrainian Academy of Sciences then discussed the achievements of social scientists. They developed the conception of socioeconomic development of the Ukrainian SSR under the 12th Five-Year Plan and for the future; they prepared suggestions for further improvement of the management mechanism, structure of industrial production and agroindustrial complex, as well as improved use of the republic's resource potential. Preparation of the three-volume work, "Ekonomicheskiye i sotsial'nyye problemy agropromyshlennogo kompleksa" [Economic and Social Problems of the Agroindustrial Complex], was a significant contribution to theory of agrarian relations under socialism. Methodological instructions on planning retooling of existing industries, which were developed together with specialists of the Ukrainian Affiliate of the Scientific Research Institute of Planning and Standards under the USSR Gosplan, were sent to the nation's ministries and agencies. Plans for development and location of productive forces in Ukrainian oblasts for the period up to the year 2000 were submitted in the Ukrainian Gosplan.

For the 40th anniversary of victory, together with the Institute of Party History under the Central Committee CPUk, a 2-volume work was prepared, "The People's Struggle in the Ukraine in the Rear Against the German Fascist Invaders During the Years of the Great Patriotic War (1941-1945)." Preparation is completed of the first part of the major work, "Atlas of History of the Ukrainian SSR." In the work of philologists, an important place is referable to investigations of processes of mutual enrichment and approximation of fraternal cultures of USSR peoples, linguistic structure in our country. Scientists devoted considerable attention to argumented critique of bourgeois and opportunistic conceptions of different aspects of social sciences and increased efficacy of counter-propaganda.

The basic tasks for social scientists were defined in the recently adopted decree of the Central Committee CPUk "Work of Institutes in the Social Sciences Section of the Ukrainian Academy of Sciences to Implement the Decisions of the 26th Party Congress, June (1983) and Subsequent Plenums of the CPSU Central Committee."

Having described the main achievements of the academy, B. Ye. Paton concentrated attention on the tasks advanced by the March (1985) Plenum of the CPSU Central Committee, on solution of problems related to successful completion of the current five-year plan and establishment of a foundation for successful work in the future. It was observed that the Ukrainian Academy of Sciences is an element of integral Soviet science, and for this reason there is no need to develop here all scientific directions without exception. The speaker stated that we should follow a well-thought-out policy of priorities, concentrate efforts and resources on the most pressing investigations, primarily those with solid scientific background, in which one could achieve serious results in the very near future.

First and foremost attention should be devoted to purposeful basic research in accordance with the approach to organization of scientific endeavor developed in the Ukrainian Academy of Sciences. The results must lead to sophisticated technologies, most modern equipment, systems for control of industry, which must be persistently introduced on a broad scale in different sectors of the national economy.

It was indicated in the paper that these basic considerations should serve as guidelines in forming plans and programs for the 12th Five-Year Plan and more distant future. They should contain primarily the most promising work capable of exerting a perceptible impact on development of different branches of knowledge, as well as the area of physical production and social relations. Such plans must be closely coordinated with the Combined Program of Scientific and Technological Progress and its socioeconomic consequences.

The speaker devoted special attention to a set of issues related to solving major problems of intensification of the economy on the basis of comprehensive acceleration of scientific and technological progress. Development and then speedy introduction of highly efficient technologies is still of great importance to the national economy. This is the long-term strategy in the work of this republic's Academy of Sciences.

Having stressed the importance of new technologies to implementation of the Food and Energy programs, the speaker indicated that academy institutions must strengthen collaboration with concerned ministries for introduction of innovations and display much initiative and persistence in this matter.

The speaker also dwelled on the role of the research centers of the Ukrainian Academy of Sciences in uniting scientific resources under the jurisdiction of different agencies, mobilizing their potential to solve pressing problems of economic and social development of regions, developing scientific-technical collaboration with oblasts of this republic and Kiev. He devoted a significant part of his report to questions of development of the experimental-design and production base of academy institutes, selection, placement and training of scientific personnel.

In conclusion, B. Ye. Paton voiced his confidence that the scientists of the Academy of Sciences will continue to deepen basic and applied research work well on solving pressing problems of acceleration of scientific and technological progress, make fuller use of scientific achievements in the interests of development of the nation's economy and welcome in a worthy fashion the 27th CPSU Congress.

The scientists who spoke at the meeting analyzed comprehensively the performance of institutions of the Academy of Sciences and its presidium; they discussed the means of solving pressing scientific-technological and socioeconomic problems and made concrete suggestions to improve the effectiveness of research. They stressed the need to concentrate on the main directions defined in the party's plans and activate involvement of scientists in work on intensification of the economy.

Many speeches were permeated with the idea of the importance of expanding and deepening basic research, which is the deciding factor for further acceleration of scientific and technological progress. The speakers cited examples of major and qualitatively new basic developments of great scientific and national economic significance. Academician YU. A. MITROPOL'SKIY discussed several theoretical investigations at the Institute of Mathematics, of which he is the head, the results of which have become the legacy of practical workers. As noted in his speech by V. D. POKHODENKO, academician of the Ukrainian Academy of Sciences and director of the Institute of Physical Chemistry imeni L. V. Pisarzhevskiy, the staff of this institute is concentrating on basic research referable to three major problems of our times--fuel-energy, food and environmental protection.

Questions of developing basically new computers, microprocessors and automated control systems were the topic of Academician V. S. MIKHALEVICH, director of the Institute of Cybernetics imeni V. M. Glushkov. G. KH. MATSUKA, academician of the Ukrainian Academy of Sciences and director of the Institute of Molecular Biology and Genetics reported on the fundamental research that has provided a good basis for development of biotechnologies of interest to the national economy.

Research in the area of basic sciences broadens our knowledge about the earth and universe. A. V. CHEKUNOV, academician of the Ukrainian Academy of Sciences

and director of the Institute of Geophysics imeni S. I. Subbotin, and YA. S. YATSKIV, academician of the Ukrainian Academy of Sciences and director of the Main Astronomical Observatory of the Ukrainian Academy of Sciences, discussed how this knowledge was enriched in the period under review.

Tasks dealing with acceleration of scientific and technological progress make it imperative for representatives of different branches of science join forces and coordinate their work, as well as strengthen its ties with industry. In discussing these issues, YA. S. PODSTRIGACH, academician of the Ukrainian Academy of Sciences and chairman of the Western Research Center of the Ukrainian Academy of Sciences, observed that research centers and their oblast scientific coordinating councils are instrumental in solving pressing problems of increasing the efficiency of industry.

The speeches by participants at the meeting reflected the desire of this republic's scientists to help solve problems of priority importance in the immediate and long-term future, which have been raised by the pressing needs of the national economy. This is the direction of research in the field of radiation solid-state physics and semiconductor physics, which was discussed at the meeting by the director of the Physicotechnical Institute, corresponding member of the Ukrainian Academy of Sciences, V. F. ZELENSKIY, and the director of the Institute of Semiconductors, academician of the Ukrainian Academy of Sciences, O. V. SNITKO. Recovery of new inorganic materials based on metals and nonmetals is one of the tasks being performed at the Institute of Electric Welding imeni Ye. O. Paton. B. A. MOVCHAN, academician of the Ukrainian Academy of Sciences, department head at that institute, devoted his talk to achievements and prospects of future research. N. V. NOVIKOV, director of the Institute of Superhard Materials and academician of the Ukrainian Academy of Sciences, talked about the importance of broader use of superhard materials in different sectors of the national economy.

Much attention was devoted to further development of social sciences. It was noted that, at the present time, scientists are concentrating their efforts on elaboration of pressing problems of Marxist-Leninist theory and improvement of developed socialism. The theoretical level of research is rising. Pressing problems pertaining to the work of social scientists were touched upon in the speeches of YU. YU. KONDUFOR, director of the Institute of History, academician of the Ukrainian Academy of Sciences, and YU. N. PAKHOMOV, head of the Kiev Institute of the National Economy, corresponding member of the Ukrainian Academy of Sciences.

The participants of the meeting discussed comprehensively questions of training scientists and specialists with high qualifications. They mentioned the need to intensify work on long-term planning of dissertation topics, tying them in closely with research plans for the 12th Five-Year Plan. Academician P. G. KOSTYUK, director of the Institute of Physiology imeni A. A. Bogomolets, spoke about the means of improving selection of talented new scientists and their training. Commenting on the increasing role of universities in training and developing scientific cadres, V. V. SKOPENKO, director of Kiev State University and corresponding member of the Ukrainian Academy of Sciences, stated that VUZ's and academy institutes must join forces to train scientists and specialists in new professions generated by scientific and technological progress.

The decrees adopted by the General Meeting outlined the tasks for scientific institutions of the Ukrainian Academy of Sciences with respect to development of investigations and increased contribution to scientific and technological progress.

Diplomas and medals were awarded to recipients of prizes named after outstanding Ukrainian scientists and prizes of the Ukrainian Academy of Sciences to young scientists and students at VUZ's for the best scientific work.

Active members (academicians) and corresponding members of the Ukrainian Academy of Sciences were elected at the General Meeting; there was confirmation of directors of scientific institutions who had been elected at general meetings of departments of the Ukrainian Academy of Sciences.

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#### New Members of the Ukrainian Academy of Sciences

The general meeting of the Ukrainian Academy of Sciences on 28 March 1985 elected new active members (academicians) and corresponding members to the Ukrainian Academy of Sciences.

The following were elected active members (academicians) of the Ukrainian Academy of Sciences.

##### Department of Mathematics and Cybernetics:

SKOROKHOD, Anatoliy Vladimirovich.  
SKRYPNIK, Igor' Vladimirovich.

##### Department of Mechanics:

LOTAREV, Vladimir Alekseyevich.

##### Department of Physics and Astronomy:

SNITKO, Oleg Vyacheslavovich.  
YATSKIV, Yaroslav Stepanovich.

##### Department of Physical and Technical Problems of Materials Science:

NOVIKOV, NIKOLAY Vasil'yevich.  
TARAN-ZHOVNIR, Yuriy Nikolayevich.

##### Department of Physical and Technical Problems of Power Engineering:

SHIDLOVSKIY, Anatoliy Korneyevich.

##### Department of Chemistry and Chemical Technology:

KUKHAR', Valeriy Pavlovich.  
POKHODENKO, Vitaliy Dmitrievich.

**Department of Biochemistry, Physiology and Theoretical Medicine:**

MATSUKA, Gennadiy Kharlampiyevich.  
SMIRNOV, Valeriy Veniaminovich.

**Department of History, Philosophy and Law:**

KONUFOR, Yuriy Yur'yevich.  
KUTSENKO, Vladimir Il'ich.

**Department of Literature, Linguistics and Art:**

MEL'NICHUK, Aleksandr Savvich.  
NOVICHENKO, Leonid Nikolayevich.

The following were elected corresponding members of the Ukrainian Academy of Sciences.

**Department of Mathematics and Cybernetics:**

LUKOVSKIY, Ivan Aleksandrovich.  
PSHENICHNYY, Boris Nikolayevich.

**Department of Mechanics:**

BURAK, Yaroslav Iosifovich.  
YEFREMOV, Ernest Ivanovich.

**Department of Physics and Astronomy:**

ZVYAGIN, Anatoliy Illarionovich.  
KOROLYUK, Aleksey Polikarpovich.  
LITOVCHENKO, Vladimir Grigor'yevich.

**Department of Earth Sciences:**

STAROSTENKO, Vitaliy Ivanovich.

**Department of Physical and Technical Problems of Materials Science:**

ANATYCHUK, Luk'yan Ivanovich.  
BABSKIN, Yuriy Zakharovich.  
ROMANIV, Oleg Nikolayevich.  
SKOROKHOD, Valeriy Vladimirovich.

**Department of Physical and Technical Problems of Power Engineering:**

DYBAN, Yevgeniy Pavlovich.  
STOYAN, Yuriy Grigor'yevich.  
SCHASTLIVYY, Gennadiy Grigor'yevich.

**Department of Chemistry and Chemical Technology:**

**ZARUBITSKIY, Oleg Grigor'yevich.**

**Department of Biochemistry, Physiology and Theoretical Medicine:**

**KRYSHTAL', Oleg Aleksandrovich.**

**Department of General Biology:**

**GLEBA, Yuriy Yur'yevich.**

**DOLIN, Vladimir Gdalich.**

**MORGUN, Vladimir Vasil'yevich.**

**Department of Economics:**

**ONISHCHENKO, Aleksey Moiseyevich.**

**Department of History, Philosophy and Law:**

**MASLOV, Vasiliy Filippovich.**

**ONISHCHENKO, Aleksey Semenovich.**

**SOKHAN', Pavel Stepanovich.**

**PHOTO CAPTION [photo not reproduced] (photo by A. Bormotov and V. Samokhotskiy, RATAU [Ukrainian News Agency])**

p 2      General meeting of the Ukrainian Academy of Sciences. On photo (from left to right): A. T. PILIPENKO, academician of the Ukrainian Academy of Sciences, director of the Institute of Colloid Chemistry and Chemistry of Water imeni A. V. Dumanskiy, Ukrainian Academy of Sciences; K. V. CHUISTOV, department head at the Institute of Physics of Metals; R. F. KLEYEVA, agronomist at the Central Republic Botanical Garden of the Ukrainian Academy of Sciences; M. V. STRADOMSKIY, doctor of engineering sciences, deputy director of the Institute of Engineering Thermophysics, Ukrainian Academy of Sciences.

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## ORGANIZATION, PLANNING AND COORDINATION

### RESEARCH COORDINATION BY SAMARKAND SCIENTIFIC CENTER

Tashkent EKONOMIKA I ZHIZN' in Russian No 2, Feb 85 pp 42-44

[Article by Doctor of Economic Sciences Professor K. Saidov, deputy director of the Samarkand Scientific Center: "The Coordination of Research"]

[Text] Samarkand Oblast has a quite significant scientific potential. There are here a network of higher educational institutions, such large scientific research institutes as the All-Union Badge of Honor Scientific Research Institute of Karakul Sheep Breeding, the Uzbek Order of Labor Red Banner Scientific Research Veterinary Institute imeni K. I. Skryabin, the Scientific Research Institute of Medical Parasitology imeni L. M. Isayev of the Uzbek SSR Ministry of Health, the Institute of Archeology of the Uzbek SSR Academy of Sciences, the Samarkand Affiliate of the Scientific Production Association imeni R. R. Shreder, an affiliate of the Uzbek Scientific Research Institute of Animal Husbandry, tens of support stations and laboratories of central scientific research institutes--in various fields of science, which are connected with the national economy of the oblast, the republic and the entire Central Asian region. More than 3,000 people, including 120 doctors and more than 1,600 candidates of sciences, are engaged in scientific work.

The activity of the scientific research institutions, which are on the territory of Samarkand Oblast, is directed by sectorial ministries and central institutes in accordance with departmental subordination. The themes of their work are planned on the basis of the tasks which face the corresponding ministries and departments. The scientific research work at higher educational institutions is also directed by the republic Ministry of Higher and Secondary Specialized Education and the sectorial ministries. The formed system is contributing to the increase of the role of centralized planning in the organization of scientific research operations, the strengthening of their connection with the national economic comprehensive goal programs and the elimination of the study of minor themes. However, under present conditions it is also revealing a number of significant shortcomings.

The main one of them is the lack of proper contact between the scientific institutions which are located on the territory of a specific region, which does not make it possible to concentrate the scientific potential on the solution of the most important national economic problems of the oblast and the republic. This especially concerns the practice of the planning of

scientific research work at the higher educational institutions which are subordinate to different sectorial ministries. But two-thirds of the scientific forces of Samarkand are concentrated precisely at higher educational institutions.

At higher educational institutions the preparation and defense of candidate and doctoral dissertations remain one of the most important indicators of scientific activity. Therefore, naturally, in case of the choice of themes of scientific research the so-called dissertatability, and not the needs of the national economy in the corresponding region, serves as the basic criterion. There is a gap between the interests of researchers and the requirements of production. In spite of the ever increasing amount of economic contractual work, the contact of science of the higher educational institution with practice remains weak. The results of research at times are not introduced in production for a long time, since it is difficult to overcome single-handedly numerous difficulties of an organizational nature.

A way out of the formed situation is seen in the establishment of a unified center, which would coordinate the work of all scientific institutions and higher educational institutions--regardless of their departmental subordination, ensuring the supervision of scientific research in accordance with the territorial principle in close combination with sectorial management. Such a scientific center was organized in 1983 by the Samarkand Oblast Party Committee jointly with the Presidium of the Uzbek SSR Academy of Sciences. It performs the role of an interdepartmental coordinating organ in the solution of problems of scientific and technical progress.

The activity of the scientific center was organized as a voluntary service--in close cooperation with the departments of the oblast party committee, the supernumerary departments of science of the city and rayon party committees, as well as the oblast commission for the increase of the efficiency and quality of work, which operates under the auspices of the oblast party committee. A coordinating council and a presidium of the council, to which leading scientists of the oblast, representatives of party organizations and specialists of the national economy belong, have been set up under the scientific center.

From the very start the center focused its attention on the organization of scientific research on four programs which are closely connected with the national economy of the oblast: they are the Food Program, the efficient use of secondary resources and environmental protection, the construction industry, manpower resources. Scientific and technical councils were set up for each program, while problem commissions were set up for individual problems within these programs. As a result of the coordinating activity of the scientific center comprehensive scientific and technical plans on the food program, as well as on the use of secondary resources and environmental protection have already been drawn up--they combine the plans of the most important scientific developments, which are connected with the national economy of Samarkand Oblast, and the plans of the introduction of the results of scientific research in production.

Here many cases of the duplication of research themes were revealed, it became clear that there is no mutual information between scientific institutions and individual scientists and that the forces and assets for the performance of scientific research work are being dispersed.

The careful analysis of the themes and the discussion by scientists, who are specialists, at the meetings of the problem commissions of each study being conducted--its urgency, its practical value for the national economy of the oblast, the conditions of the introduction of the obtained results and so on--all this now precedes without fail inclusion in the coordinating plan of the themes of scientific research work of higher educational institutions, scientific research institutes and laboratories.

The provision of procedural assistance to scientific institutions, the monitoring of the fulfillment of the plan of scientific developments by stages and the checking of the results of their introduction in production are included in the tasks of the scientific center. All this is increasing the responsibility of scientific subdivisions for their activity and is tightening up planning discipline.

A number of problems, the solution of which requires the joint efforts of party and soviet organs, scientific institutions and the corresponding ministries and departments, also arose during the coordinating work of the scientific center.

When drawing up the long-range plans of scientific research the sectorial ministries and central scientific research institutions should, in our opinion, study more thoroughly and take more completely into account the needs of the specific region where their scientific subdivision is located. This would help to eliminate the lack of coordination between the research activity of scientific institutions and the needs of the production sectors of this region. For the present it is turning out that the most serious tasks which now face Samarkand Oblast--the fundamental renovation of many sectors of industry and construction, the determination of the prospects of the development of the productive forces, the efficient use of manpower resources and other most important problems of the socioeconomic development of the oblast--are not finding proper reflection in the plans of the scientific research work of the higher educational institutions and scientific research institutes of Samarkand.

Many chairs of higher educational institutions does not have permanent contacts with production enterprises and do not know their requirements. In turn the enterprises, without suspecting the possibilities of local higher educational institutions, conclude contracts for scientific developments with the corresponding institutions of other cities, which involves additional expenditures of assets and time. It seems that there has come a time when the chairs of higher educational institutions should plan the scientific work of their collective in conformity with the orders of production enterprises, using for this cost accounting levers and contracts of cooperation. This especially concerns the natural and applied sciences.

The absence of an experimental production base at higher educational institutions is one of the factors which are hindering the development of science and the introduction of its achievements in production. Whereas scientific research institutes have such a base (although here, too, it is necessary to strengthen it substantially), higher educational institutions most often do not have it at all. The creation of such a base or, perhaps, the attachment to higher educational institutions of specific production enterprises should be thought about.

The increase of the responsibility of managers of enterprises and organizations for the timeliness of the introduction in production of the results of scientific developments and the creation of favorable conditions for this seems very important in light of the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy."

The introduction of the results of scientific research in production requires skilled personnel. Even in case of the provision of procedural assistance on the part of the developers and in case of regular consultations on the use of scientific recommendations it is difficult to obtain the anticipated impact from their introduction, if for production its own personnel are not trained.

Thus, for many years at the enterprises of Samarkand Oblast the recommendations on the automation of the control system, which were accepted for introduction, have remained unrealized, since the necessary specialists are lacking. Even the engineering and technical personnel were not prepared for this work.

The Samarkand Scientific Center jointly with the Computer Center of Samarkand State University organized 2-month courses on the study of the principles of automated control systems for engineering and technical personnel and specialists of the national economy. But this problem, apparently, concerns not only Samarkand. It can basically be solved only if the corresponding courses are included in the syllabuses of higher and secondary specialized educational institutions.

The activity of the Samarkand Science Center (although so far a short time has passed) showed that its establishment was completely justified. With time it is proposed also to cover by coordinating work in the area of scientific research other questions of the development of the national economy--in addition to the four programs which have already been included in the plan of activity of the center.

In the future it is possible also to extend the coordinating activity of the scientific center to other oblasts of the Zarafshan Lowland, where there are also considerable scientific forces, and, thus, to create a scientific center which would concentrate the scientific forces of the region for the solution of the most important problems connected with the socioeconomic development of the republic.

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ORGANIZATION, PLANNING AND COORDINATION

SESSION OF UNION SCIENCE COORDINATING COUNCIL, KAZAKH TASKS

Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 1, Jan 85 pp 23-25

[Article: "On the Implementation of the Decrees of the 41st Session of the Council for the Coordination of the Scientific Activity of the Academies of Sciences of the Union Republics Attached to the Presidium of the USSR Academy of Sciences"]

[Text] The 41st session of the Council for the Coordination of the Scientific Activity of the Academies of Sciences of the Union Republics, which was held in Yerevan on 17-20 September 1984, discussed a number of questions, including:

--the progress of the fulfillment by the academies of sciences of the union republics, the scientific centers and affiliates of the USSR Academy of Sciences of the decisions of the June (1983) CPSU Central Committee Plenum and the subsequent decrees of the CPSU Central Committee on questions of the development of science;

--the development at the academies of sciences of the union republics, the scientific centers and affiliates of the USSR Academy of Sciences of research, which is aimed at the support of development and the organization of the use of modern computer equipment and means of information science;

--studies of transient phenomena in the universe and the coordination of this work at the USSR Academy of Sciences and the academies of sciences of the union republics.

The large amount of work, which has been done by the academies of sciences of the union republics on the implementation of the decisions of the June (1983) CPSU Central Committee Plenum and the subsequent decrees of the CPSU Central Committee on questions of the further development of science, was noted in the report of Vice President of the USSR Academy of Sciences Academician P. N. Fedoseyev on the first question.

In the area of the social sciences much attention is being devoted to the further elaboration of the economic and social problems of mature socialism, the broadening of research, which promotes the development of the productive forces, and the acceleration of scientific and technical progress. The

research on the improvement of national relations, the further strengthening of the fraternal friendship of the peoples of our country and the international education of the working people is being expanded.

Economic scholars have stepped up the elaboration of the problems of political economy, the improvement of the mechanisms of management and administration, the economic education and vocational and technical training of young people, the efficient use of manpower resources, the organization and forms of socialist competition and the sociology of labor.

The scientific collectives of the academies of sciences of the union republics are developing research in the area of the creation of efficient domestic technology on the basis of the automation of production, the extensive use of electronics, computers and robots, the development of materials with preset properties, waste-free and energy-saving technologies, the automation of planning and design work and the fulfillment of the Food and Energy Programs.

The most important measures on the implementation of the decisions of the June (1983) CPSU Central Committee Plenum, which are being carried out by the academies of sciences of the union republics, including the Kazakh SSR Academy of Sciences, on the speeding up of the solution of urgent scientific and technical problems are cited in the report.

The session of the coordinating council noted that along with definite successes the potentials of the academies of sciences of the union republics, the scientific centers and affiliates of the USSR Academy of Sciences are still not being fully used. The uniting of the efforts of scientists of the republics for the elaboration of major basic and applied problems is being complicated significantly by the departmental isolation of many scientific institutions, which is leading to the study of minor themes, duplication and the inefficient use of the scientific potential and material and technical resources. Not all the academies of sciences of the union republics have become coordinating centers of research in the area of the natural and social sciences. The interaction and cooperation of scientific research and the joint use of expensive and unique equipment and pilot industrial bases are still poorly organized. The interrepublic scientific relations and the research, which is being conducted on the most important regional problems, are inadequate.

For the successful implementation of the decrees of the 41st session of the Council for the Coordination of the Scientific Activity of the Academies of Sciences of the Union Republics the Presidium of the Kazakh SSR Academy of Sciences obliged the executives of the departments and scientific institutions of the Kazakh SSR Academy of Sciences:

--to discuss the decree of the session "On the Progress of the Fulfillment by the Academies of Sciences of the Union Republics, the Scientific Centers and Affiliates of the USSR Academy of Sciences of the Decisions of the June (1983) CPSU Central Committee Plenum and the Subsequent Decrees of the CPSU Central Committee on Questions of the Development of Science";

--to elaborate and implement specific measures, which ensure the improvement of the quality and efficiency of scientific research and the increase of its scientific and practical importance, having specified the most important problems of the republic (region), and to focus on them the efforts of scientists of institutes, higher educational institutions and sectorial scientific research institutes, to allocate material and financial resources. To take the necessary steps on the shortening of the time of research and on the acceleration of the introduction of completed research in production;

--to persistently perform work on the broadening and strengthening of the contacts of academic science with production and on the organization of joint scientific laboratories and experimental bases with sectors for the checking of completed development;

--to ensure the closer connection of the natural and social sciences on the basis of the thorough and creative elaboration of the key problems of social progress. To raise the social sciences to a new level of planning and organization;

--to develop research, which is aimed at the assurance of the scientific forecasting of the phenomena and processes of social life, the timely identification of new trends and the elaboration of effective practical recommendations, which accelerate scientific and technical progress, the formation among workers of a Marxist-Leninist world outlook;

--to concentrate the efforts of scientists, regardless of departmental subordination, on the spread of scientific knowledge about the achievements of real socialism, the exposure of the misinformation and falsification of bourgeois propaganda on the history, economy and culture of the union republics with allowance made for the specific regional nature of each of them;

--in connection with the 40th anniversary of the victory of the Soviet people in the Great Patriotic War to elaborate measures on the preparation for the celebration in 1985 of this historical event, having directed particular attention to the timely and high quality publication of anniversary editions, the holding of general meetings and theoretical conferences.

For the purpose of implementing the decree of the 41st session of the Council for the Coordination of the Scientific Activity of the Academies of Sciences of the Union Republics attached to the Presidium of the USSR Academy of Sciences the Presidium of the Kazakh SSR Academy of Sciences gave a number of assignments to the Social Sciences Department, the Physical and Mathematical Sciences Department, as well as the Council for Automation, Computer Technology and Scientific Instrument Making attached to the Presidium of the Kazakh SSR Academy of Sciences.

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AUTOMATION AND INFORMATION POLICY

LACK OF PROGRAMS FOR MICROCALCULATORS

Moscow MEDITSINSKAYA GAZETA in Russian 27 Mar 85 p 2

[Article by Professor S. Vaynshteyn (Ternopol): "Medical Researchers Need Programs for New Microcomputers"]

[Text] Programmable microcomputers have made possible rapid mathematical processing of numerical research material by a wide range of scientific workers, including biologists and medical personnel who do not have special training. This can be done only if programs are available, however, and their writing requires special skills. A book, "Processing of Results of Biological Experiments with the Microcomputer 'Elektronika BZ-21'", was published in 1979 by the "Naukova dumka" publishing house in Kiyev, as an aid to scientists.

The "Elektronika BZ-21" is no longer in production, however. An improved version of it, the "Elektronika BZ-43", has appeared, and the latest model, the "Elektronika MK-54", is a pocket computer in the true sense of the word. But when will there be programs for these microcomputers?

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AUTOMATION AND INFORMATION POLICY

UDC 681.3.02

SERVICE FOR USERS OF KAZAKH COLLECTIVE-USE COMPUTER CENTER

Alma-Ata VESTNIK AKADEMII NAUK KAZAKHSKOY SSR in Russian No 1, Jan 85 pp 46-49

[Article by A. D. Aliyev and V. A. Tsay: "The Organization of a Reference and Consulting Service for Users of the Collective-Use Computer Center of the Kazakh SSR Academy of Sciences"; passages rendered in all capital letters printed in italics in source]

[Text] 1. At present the establishment of collective-use computer centers is one of the basic trends in the development of computer technology in our country. The establishment of collective-use computer centers entails the sharp increase of the number of computer users--both in general and at each specific center, which, in turn, gives rise to new problems in the organization of the computing process, the technology of data processing, the service of users and others.

The prerequisites of the establishment and the tasks of the Collective-Use Computer Center of the Kazakh SSR Academy of Sciences are presented in work [1]. In this article the use of the Collective-Use Computer Center of the Kazakh SSR Academy of Sciences is characterized and the reference system, which is intended for the facilitation of his work, is described.

The specification of the group of users of the computer center or the specific system is conducive to such a choice of the software and the means of access to it, in case of which the use of the computer will be most efficient. One of the first classifications of the users of the computer is given in book [2]; a portrait of the user, who is close to the "academic" user, is given in [3]; the nonprofessional user is described most systematically in work [4]. The reference service system, which performs the most diverse functions--from the output of references to the copying of files--is described in work [5].

The characterization of the user, which is cited below, is distinguished by greater specification; the proposed system is narrowly specialized and is oriented toward a specific user, owing to which it is technologically efficient and easy to use.

2. The Collective-Use Computer Center of the Kazakh SSR Academy of Sciences serves mainly the institutes of the Kazakh SSR Academy of Sciences. The majority of institutes do not have special subdivisions for programming,

therefore for the computer-aided solution of problems they are forced either to turn to other organizations or to direct the attention of their specialists to the mastering of programming. Thus, the bulk of the users of the Collective-Use Computer Center of the Kazakh SSR Academy of Sciences is made up of so-called nonprofessional users, whom it is possible to divide arbitrarily into two large groups:

- a) the parametric, or end, user--the user, who does not know how to program and uses only off-the-shelf programs;
- b) the nonprofessional programmer--the user who, on the one hand, is not a specialist in the area of computer technology, more precisely of programming, and, on the other, writes and debugs programs for the solution of his own problems.

Whereas the service of the former group is a matter of the near future, the second group constitutes at present a substantial majority. In describing this group, let us dwell on the following features: the general data, the attitude toward programming, a characterization of the problems being solved, the use of the computer and the ultimate goal of the work with the computer.

#### GENERAL DATA:

- scientific associate, a higher education, up to the age of 35;
- type of activity--specific research;
- held positions--engineer, senior engineer, junior scientific associate, senior scientific associate;
- there are specific problems, for the solution of which the use of a computer is required.

#### ATTITUDE TOWARD PROGRAMMING:

- limited time for the mastering of programming;
- a poor idea or ignorance of the general principles, methodology, technology;
- a poor orientation in operating systems;
- the used language--FORTRAN.

#### A CHARACTERIZATION OF THE PROBLEMS BEING SOLVED:

- the overall structure--of a small or more rarely average degree of difficulty;
- the amount of programming--from 200 to 1,000 operators;
- the data input is of a single type, of comparatively small size, there is a need to access the data banks;

--the output is of a comparatively small amount, is not used as official documents, an average degree of clearness and legibility is required;  
--the counting time can be significant.

#### THE USE OF THE COMPUTER:

--unregulated (that is, there are no strictly assigned days, hours), erratic during the year;  
--a large percentage of the used time for the debugging of programs;  
--the absence of a strict rule for the time of development;  
--a personal interest in shortening the time of development;  
--the frequent making of changes in the program, a large number of compilations.

#### THE RESULTS OF THE WORK WITH THE COMPUTER:

--the programs being developed are intended for occasional, perhaps, even one-time use, and not for commercial use;  
--the results obtained by means of the developed programs are used in scientific research.

It is necessary to take into account the listed features of the average "academic" user in case of the determination of the operating conditions of the computer center, the organization of the technology and the choice of the general systems software. As a whole this finds expression in the preferential use of the time sharing mode and systems of programming, which are based on it, as well as in the organization of a number of services for the management of the stock of algorithms and programs, the tracking of sets of data and the providing of consultations.

3. At present consultations are held by the systems programmer on duty at a specific time. Such a system is not always, especially in case of remote access, convenient for the user, does not ensure a constantly high level of consultations, frequently keeps the systems programmer busy with routine work on the retrieval of reports in the systems documents and is poorly suited for the consideration of the experience of previously given consultations. For the elimination to some extent of the enumerated shortcomings a small system for the automation of consultations on messages of the operating system and the compilers has been set up at the Collective-Use Computer Center of the Kazakh SSR Academy of Sciences.

The system operates in a time sharing mode and consists of data arrays and a program for the output of references. The purpose of the latter is the output at the terminal on the inquiry of the user of reference information, which is contained in the systems documents, and of recommendations of the systems programmer, if they exist.

All the information is stored in conventional library files. Standard means of the operating system can be used both in the batch processing mode and in the time sharing mode for their creation, supplementing and correction.

For obtaining a reference it is sufficient for the user to enter in the time sharing mode the command SOS and the code which interests him. The command is executed by a special processor, which was developed in conformity with the requirements of the time sharing system and uses its means: the signal "VNIMANIYE" from the terminal is processed by means of the STAX auxiliary program; the command and the operands are analyzed by the SCAN and PARSE auxiliary programs; by means of the DAIR program the necessary library set, which is determined according to the first three symbols of the goal, is distributed dynamically to the processor; the input and output at the terminal is accomplished by the TGET and TPUT macrocommands.

The format of the command is:

SOS 'code'[D (name of data set)]

where "code" is a mandatory operand, which identifies either the code of the execution of the operating system or compiler or the section of the library, which is specified by the operand "name of data set"; "name of data set" is an optional operand, which specifies the library which contains a section with the name "code"; if this operand is omitted, the library is chosen in accordance with the first symbols of "code"; for example, the code IEY0241 specifies the library SYS1.IEY. For the obtaining of information in accordance with the code of the execution of the operating system it is necessary before the code to type the symbol S--the corresponding section should be contained in library SYS1.SOS.

#### 4. The following technology of the use of the described system is proposed:

--in case of the emergence of an unclear situation and in the presence of a message of the operating system the user addresses the reference and consultation system with the command SOS and obtains the information available in the system;

--if there is not enough information to understand the situation, the user turns to the systems programmer;

--if an answer is found, the information on the situation can be entered in the corresponding section in the form of a precedent or recommendations of the systems programmer.

The use of the system will make it possible:

--to provide additional comfort for the user;

--to free the systems programmer from routine duties on the retrieval of information in the systems documents and on consultations on the same errors;

--to use qualified recommendations and the experience of previously analyzed errors.

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AUTOMATION AND INFORMATION POLICY

MOSCOW TV VISITS COMPUTER CENTER IN KALININ

LD161801 [Editorial Report] Moscow Television Service in Russian in its "Novosti" cast at 1030 GMT on 16 May carries a 3-minute report by Z. Bukhalov from the Program System Center Self-financing Scientific Production Association in Kalinin. Bukhalov explains that in order to solve the problem of the creation of mass industrial production of programmes on an up-to-date technological basis more centers are needed such as that in Kalinin, set up 10 years ago. The video shows a large open-plan office with people operating VDU's and large computers. Flow-charts and diagrams are displayed on the walls. Bukhalov describes the complex as a scientific institute for research into software for automated production systems, a design bureau for automated production systems, a publishing-polygraphic production unit, and a training and methods center.

Doctor of Economic Sciences V.P. Tikhomirov, identified by caption, is then seen answering an off-camera interviewer. Tikhomirov notes that though much experience has been gained, there are still problems. Soviet industry, he says, produces quite a large quantity of computers, but in order for these computers to be used efficiently and profitably, it should be possible to produce software for the same price as a computer. The economics of software, he says, needs to be worked out. He concludes by saying that the success of computers depends on people, their level of training, and their understanding of the equipment. At Kalinin, he notes, the training center trains specialists in the use of programs, but this needs to be done on a state-wide scale because this would do much to solve the problem of computer literacy in the country.

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## AUTOMATION AND INFORMATION POLICY

### REPUBLIC AUTOMATED INFORMATION SYSTEM FOR SOCIAL SCIENCES

Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 1, Jan 85 pp 101-103

[Article by A. Berzin'sh and V. Khisamutdinov: "The Basic Concept of the Standard Automated Information System for the Social Sciences of the Union Republic"]

[Text] At present in our country work is being launched on the development of an automated system of scientific information on the social sciences (ASNION) and a network of automated centers of scientific information on the social sciences (SATsNION). Automation, being the most important means of increasing the efficiency of scientific information activity under present conditions, requires considerable capital investments and human resources. It is necessary to study and to solve in practice a large number of problems, which are connected with the meaningful processing, transmission, entry, accumulation, storage, representation and copying of information on the social sciences.

The sharp increase of the social value of information is responsible for the expedience of the research being conducted. As Academician of the USSR Academy of Sciences V. A. Vinogradov, director of the Institute of Scientific Information on the Social Sciences (INION), indicates, although knowledge and information always had enormous social value, only in the 20th century, with the increase of the pace of social development and the development of the scientific and technical revolution, did they turn into a truly strategic resource of mankind.

With allowance made for the foregoing, the assurance of the possibility of the use when developing a specific republic system of standard formalized decisions, which leads to the sharp decrease of the expenditures of resources and time in each individual case and on a statewide scale and is conducive to the achievement of high indicators of the quality and the efficiency of operation of these systems, is the goal of the development of a standardized automated information system for the social sciences of the union republic.

The urgency of the formation of the concept and the principles of the development of the standard republic automated information system for the social sciences (RAISON) consists in the following:

--centers or departments of scientific information on the social sciences have been organized at the academies of sciences of the union republics;

--some experience of the development of RAISON's has been gained in four republics: the Belorussian, Georgian, Latvian and Estonian SSR's;

--the establishment of an RAISON in each union republic is necessary for the efficient operation of the automated system of scientific information on the social sciences as a subsystem of the state automated system of scientific and technical information (GASNTI).

The prerequisites of the standardization of the automation of information service and the practical possibility of developing a standard RAISON result from the following positive factors:

--the experience of the development and operation of the state automated system of scientific and technical information;

--the experience of the development and operation of the automated information system (AIS) of the Institute of Scientific Information on the Social Sciences;

--a certain uniformity of the processes and technology of information service in the union republics;

--the possibility of using the services of the magnetic tape services of the All-Union Institute of Scientific and Technical Information (VINITI), the All-Union Scientific and Technical Information Center (VNTITsentr) and the Institute of Scientific Information on the Social Sciences;

--the possibility of using remote access to the data banks of the Institute of Scientific Information on the Social Sciences;

--the experience and prospects of the development of Academy Network;

--the production of powerful minicomputers and microcomputers;

--the accessibility of standardized problem-oriented software systems and modern systems for minicomputers;

--the large amount of experience, which has been gained in our country, in the area of the standardization of automated control systems (ASU's), including block, package and modular designing, the group method of designing, the development of automated control systems on the basis of standard design decisions, the use of packages of applied programs.

The basic functions of the RAISON consist in the following:

--the automation of the processes of the information service of users (party and state workers, social scientists, instructors and others) in the republic on the basis of modern means of computer technology and data transmission;

--the realization of a portion of the distributed all-union data bank of scientific information on the social sciences;

--the processing of the "ascending flow" of documents in the republic and their transmission to the automated information system of the Institute of Scientific Information on the Social Sciences;

--the development of the methodological bases for the further improvement of the processes of information service in the republic.

For the development of the standard RAISON it is proposed to use the method of standard design decisions when developing the functional part and the support subsystems, as well as problem-oriented systems and packages of applied programs for the development of software.

The following basic stages of the development of the systems on the territorial level are envisaged:

--the start-up complex, which encompasses the institutes of the social sciences department of the academy of sciences of the union republic and the basic library;

--the first section, which includes the information service of party and state organizations, the higher educational institutions and main libraries of the capital of the republic;

the section section, which includes the central libraries of the cities of republic subordination and the higher educational institutions outside the capital of the republic.

For the union republics with an oblast division it is advisable to single out additional sections, which are connected with the development of oblast subsystems of the republic system.

The principles of the development of the state automated system of scientific and technical information serve as the unified methodological basis for the development of the standard RAISON.

In the functional aspect at the level of the start-up complex the development of the first six standard functional subsystems in accordance with the recommendations of "The Unified Procedure of the Elaboration and Development of Automated Systems of Scientific and Technical Information" is envisaged, namely: the making up of the information fund, the entry of scientific information on the social sciences, the accumulation and storage of information on the social sciences, the selective dissemination of information, the copying of data files and the retrospective retrieval of information.

For the assurance of a leading scientific and technical level and data compatibility when developing the information and linguistic support it is proposed to use a number of basic design decisions of the automated information system of the Institute of Scientific Information on the Social

Sciences, including the structure and composition of the precomputer format of the input documents; the method of annotation; the method of composing the search patterns of documents and of indexing the data inquiries; the basic thesaurus on the social sciences, the subject index of the automated information system and others.

The indicated approach ensures the complete information and technological compatibility of the union (the automated information system of the Institute of Scientific Information on the Social Sciences) and the republic (RAISON) levels. It is envisaged to fed into the database of the RAISON in a year from 50,000 to 100,000 (depending on the specific needs of the union republic) documents of the "descending flow," which have been selected on the basis of the republic subject index, and from 1,000 to 3,000 documents of the "ascending flow" of publications on the social sciences in the union republic.

There are fed into the computer for each republic: a bibliographical description, an annotation, codes of the headings and key words (the search pattern of the document). The standard RAISON makes available to the users information about publications on the following scientific subjects: history, philosophy and law, sociology, demography, linguistics, literary criticism and art criticism.

The SM-4 process control computer complex is used at the basis of the hardware. The technical characteristics of the data of the minicomputers are close to the characteristics of medium-sized computers of the YeS series, but for the operation of the computers of the SM-4 smaller production areas and fewer attendants are required.

The software of the start-up complex of the RAISON is a set of complexes of general systems and applied programs. It is created according to the modular principle on the basis of the general systems requirements, as well as the requirements which are advanced by the information and linguistic support and the hardware complex.

The OS-RV real-time operating system constitutes the basis of the general systems software of the start-up complex of the RAISON. The OS-RV system ensures the solution of a broad class of problems on the basis of the SM-4 computer complex, including the establishment of complex, territorially distributed large information retrieval systems, in which the storage and immediate processing of a significant amount of data are carried out. The OS-RV operating system is designed for work with various equipment, since the version of the system is generated subject to its application, including the configuration of the SM-4 computer complex. This is conducive to the adaptability of the software of the standard RAISON to the specific operating conditions.

The inclusion of the RAISON in the Academic Network is a most important factor of the substantiation of the use of this operating system.

The applied software of the system consists of four sets of programs, which are intended for the entry, checking, correction, storage, retrieval and presentation of information.

The database of the start-up complex of the RAISON should consist of a buffer and a retrieval base. The buffer database is intended for the entry, checking and correction of documents. The retrieval base is used for the accumulation, storage, retrieval and provision of information.

The use of the principle of dispersion is an essential advantage in the organization of the database of the start-up complex of the RAISON, the space for data is not reserved in advance. Only the records (elements) of files, which are completely defined or which are necessary for the maintenance of the structure of the files, are created and maintained.

The indicated approach ensures:

- the dynamic allocation of the external memory (the space on the disks);
- the saving of space in the external memory;
- the minimization of the information retrieval time.

The technology of the standard RAISON is being elaborated for the purpose of its quick adaptation and introduction, as well as the assurance of continuous development. It consists in the joint functioning of two parts of the system: 1) the entry of republic information into the database and the accomplishment of retrieval on the computer of the Center of Scientific Information on the Social Sciences of the academy of sciences of the union republic; 2) the retrieval of information with the use of the communications channel in the database of the Institute of Scientific Information on the Social Sciences. At the level of the start-up complex of this system the retrieval of information in the selective information distribution mode on its own computer and retrospective retrieval in the databases of the automated information system of the Institute of Scientific Information on the Social Sciences from the Terminal Information Center via telephone communications channels, as well as the exchange of documents of the "ascending" and "descending" flows with the use of the magnetic tape service are proposed.

The indicated approach should ensure:

- the optimum coverage of users on the basis of the joint functioning of the union and republic levels of the distributed data bank on the social sciences;
- the minimum material, human and time resources for the development and use of the system;
- the possibility of the quick introduction of the system into operation;
- good prospects for the development of the system.

The proposed approach as a whole ensures the observance of the general methodological principles of the development of automated systems: a systems approach, a hierarchy, standard design decisions, modularity, adaptability, external supplementing and development.

The practical implementation of the formulated concept of the development of a standard RAISON has been started at the Center of Scientific Information on the Social Sciences of the Institute of Economics of the Latvian SSR Academy of Sciences. A detail contract design of the start-up complex of the RAISON, which implements the approach presented above and has been recommended by the head organization for the development of the automated system of scientific information on the social sciences of the Institute of Scientific Information on the Social Sciences of the USSR Academy of Sciences as the basis for the standard detail contract design of the RAISON of the union republic, has been developed at the Center of Scientific Information on the Social Sciences. A terminal information center, which carries out the regular retrieval of information in the databases of the automated information system of the Institute of Scientific Information on the Social Sciences, has been organized within the Center of Scientific Information on the Social Sciences. Its own SM-4 computer has been put into operation. The documents of republic publications on the social sciences for 1982 have been entered in the database and the processing of the flow of 1983 is continuing. The technology of the exchange of information with the automated information system of the Institute of Scientific Information on the Social Sciences has been developed.

The DIAMS-2 dialogue information automated multiple-console system was used when developing the general systems software of the start-up complex of the RAISON of the Latvian SSR. The DIAMS-2 operating system is a system, which is oriented toward the creation of large databases and the solution of information logic problems. At the initial stage of the development of the system, when the minimum configuration of the SM-4 exists, this operating system can be used successfully.

At present the conversion to the OS-RV operating system is being carried out in the RAISON of the Latvian SSR.

The standard detail contract design of the start-up complex of the RAISON is being developed under the scientific supervision of the Institute of Scientific Information on the Social Sciences of the USSR Academy of Sciences. It is envisaged to carry out the testing of the developed design at the Latvian SSR Academy of Sciences, the Belorussian SSR Academy of Sciences (since the Center of Scientific Information on the Social Sciences of the Belorussian SSR Academy of Sciences has considerable experience of working with the databases of the Institute of Scientific Information on the Social Sciences) and the Kazakh SSR Academy of Sciences.

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INTERNATIONAL S&T RELATIONS

POLISH-BELORUSSIAN AGREEMENT ON SCIENTIFIC COOPERATION

Minsk SOVETSKAYA BELORUSSIYA in Russian 21 Feb 85 p 3

[Article (BELTA): "Strengthen the Cooperation of Scientists"]

[Text] The significant extension and broadening of scientific ties between the academies of sciences of Belorussia and the Polish People's Republic is envisaged by the agreement on cooperation for 1986-1990, which was signed on 20 February in Minsk. A delegation of the Polish Academy of Sciences headed by its scientific secretary, Academician Zdzislaw Kaczmarek, came for its signing.

"The agreement proposes the broadening of cooperation in the natural and social sciences," President of the Belorussian SSR Academy of Sciences Academician N. A. Borisevich told a BELTA correspondent. "Joint research will be actively conducted in the area of mathematics, physics, solid-state and semiconductor physics, organic chemistry, biology and geology. The program also includes the preparation of a Belorussian-Polish and a Polish-Belorussian phraseological dictionary, monographs on history, Soviet-Polish military cooperation during the years of World War II and the development of Belorussian-Polish relations during the 17th-20th centuries in the area of architecture, fine arts, the theater, musical folk art and literature. The joint work with Polish scientists will help to solve more successfully the basic scientific problems which are of interest to the Belorussian SSR and Poland."

The members of the delegation of the Polish Academy of Sciences were received by Deputy Chairman of the Belorussian SSR Council of Ministers V. I. Kritskiy. Polish Consul General in Minsk J. Raczkowski took part in the discussion.

The Polish guests visited the international center of the Academy of Sciences of the socialist countries for the increase of the skills of scientists for the problem "Heat and Mass Exchange" and scientific institutions of the city and of the republic Academy of Sciences. They made a trip to the Khatyn' Memorial Complex and the Burial Mound of Glory.

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GENERAL

CONCEPT, FUNCTIONS, CONTROL OF INNOVATION SYSTEM

Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA, SERIYA 6: EKONOMIKA in Russian No 1, Jan 85 (manuscript received 21 May 84) pp 47-54

[Article by V. L. Tambovtsev and M. A. Marushkina: "The Innovation System: Problems of Analysis and Control"]

[Text] 1. The Concept of the Innovation System. The resource potential of the socioeconomic development of our society is a complex dynamic system, the basic function of which consists in providing the conditions for the extensive meeting of increasing social, collective and personnel needs. Therefore, its development, constituting the basis of the setting and achievements of the goals of the development of the country, acts as an independent object of systematic influence on the part of society. "The immediate goal is clear: first of all it is necessary to establish order in what we have, to ensure the most intelligent use of the production and the scientific and technical potential of the country...."<sup>1</sup> The planning of the development of the resource potential precisely is the most important condition of the rationalization of its use.

It is necessary to take into account here that the assurance of the systematic development of the resource potential "means not only the increase of resources quantitatively, but first of all the increase of the qualitative level of resources."<sup>2</sup> A thorough analysis of the concept "quality resources" is given by Yu. V. Yaremenko: "In immediate form the quality category of resources is determined by the technical level of the used means of production and skilled manpower. In the end this is connected with the length of the preliminary cycle, which precedes the moment of the commitment of resources to production. The preliminary cycle encompasses the formation of skilled manpower, the designing and the assimilation of the output of the necessary equipment and the development of materials with the required characteristics."<sup>3</sup>

It is easy to see that the transfer of resources from the category of mass resources to the category of quality resources is connected first of all with scientific and technical progress and depends on its intensity. On this basis, within the socioeconomic system of society it is possible to distinguish a specific subsystem, the function of which consists in the increase of the qualitative level of resources--manpower, material,

information and so forth. We will call it hereinafter the innovation system, since the increase of quality resources is nothing other than the development and the assimilation by social reproduction of some innovations or others.

At present by innovation it is customary to understand the process, which includes the generation of a new idea with respect to products, technology, the form of the organization of production or management: the analysis and selection of received suggestions; the testing of a development under production conditions; mass production and evaluation on the part of consumers. Innovation and the innovation process are thereby interpreted as combined, complex phenomena, which have diverse aspects of analysis, "levers" of control and forms of interaction with social production and its organizational aspect. It is important to emphasize this, since frequently innovations are studied "unidimensionally"--as technical, economic, psychological and organizational problems and so forth, while the concept of the innovation system receives, as a rule, only an organizational interpretation.<sup>4</sup>

It is difficult to overestimate the necessity and importance of such disciplinary studies of innovations and the innovation system: the obtaining of the corresponding synthetic knowledge is impossible without their results. At the same time such studies will be more purposeful, if from the very start the solution of the interdisciplinary problem of the assurance of the efficient control of the innovation system, which is aimed at the qualitative increase of the resource potential of the socioeconomic development of the country, appears as their end result.

The interaction of the components of the innovation system, which is examined at successive moments of time, is the innovation process. The majority of researchers, who have analyzed its structure, distinguish the following stages: the making of an innovation decision--the experimental introduction of the innovation--the dissemination of the innovation--the occurrence of changes caused by it in the socioeconomic system--the retirement (replacement) of the innovation.<sup>5</sup>

In our opinion, this chain should be supplemented by the initial link--the stage of the emergence of the innovation situation. Let us note that the retirement of an innovation (the final stage of the innovation process) is a potential source of the emergence of the innovation situation; the entire process thereby assumes a cyclical nature.

We will call the problem situation, for the overcoming of which a decision is made on the experimental introduction of the innovation (the innovation decision), the innovation situation. Like any decision-making situation, it is characterized by: the subject, the set of its needs (goals), the set of versions of the achievement of the goals, the criterion of the choice of the best version. The specific nature of innovation situations is traced in accordance with three components: the system of needs, the set of versions and the criterion of choice. The need, which gave rise to the innovation situation, as a rule, is always "secondary" in the sense that it arises as a consequence of the impossibility of meeting some functional or objective need of the subject<sup>6</sup> by means of the set of means which it has. The emergence of a

new idea (innovation) thereby does not yet create an innovation situation: for this it should be combined with some need or another of a specific subject. Hence, the search for the "missing" components for the ones which have already emerged precedes the formation of the innovation situation. Depending on what was primary--the innovation or the need of the organization, it is possible to divide innovation situations into passive and active situations. In the former case the author of the innovation (in particular, an entire organization) seeks a sphere for its application in production, compares it with the available means and substantiates the preferableness of his own suggestion. In the latter case the organization or the organ of management, which is experiencing a need for a change of work for the achievement of its own goals or the realization of functions (assignments), acts as the initiator of the search. The breakdown of the positions of the participants in the innovation process (initiative, assistance, inaction, counteraction),<sup>7</sup> by which the success of the innovation is determined, depends on the nature of the innovation situation; the formation of passive situations is backed much less informationally, organizationally and technically than the formation of active situations, since for the latter a branched system of scientific and technical information at the works serves as the base.

The criteria of the choice of versions in innovation situations are very diverse. With respect to content it is possible to divide them conditionally into technical, economic and social criteria, while with respect to the subject of the decision--into national economic (external) and local (internal, organizational, "departmental") criteria. The specific content of the criteria, which are used for making an innovation decision, also depends on the scale of the innovation. Here it is possible to distinguish minor, major (sectorial) and national economic (intersectorial) innovations, of each of which its own rules of the choice of versions is characteristic. As a whole, thus, 18 groups of innovation situations are revealed. Their detailed examination goes beyond the framework of this article. Let us note merely the dependence of the complexity of the set of criteria on the scale of the innovation; whereas purely economic criteria with a certain allowance made for social factors are used for the choice of versions of minor innovations of a production nature, for scientific and technical programs, which implement innovations of a national economic scale, the decisions depend on the set of anticipated social, scientific, technical and economic results. In practice the following trend has also been noted: for organizations, which are the initiators of an innovation, the technical, social and economic national economic criteria are of great importance, while for the organizations, which are the users, the local economic and social criteria are.

For the more complete and accurate posing of the named task it is necessary to answer at least three questions: What is the structure of the innovation system? What are its functions, as well as the functions of its individual blocks, components and subsystems? What is the meaning of the concept of efficiency as applied to the implementation of these functions and to the activity of the innovation system as a whole? The answers to them are closely interconnected, since the innovation system in its essence is a functional system: some components or others are assigned to it in accordance with the attribute of participation in the innovation process, and not in connection

with departmental (administrative) affiliation or other formal organizational attributes.

The content of the concept of the efficiency of the innovation system once again stems from the functions of the system, but, on the other hand, the requirement of efficient activity determines the composition and structure of the system. Thus, the question of the functions of the innovation system is central when formulating the task of the assurance of the efficient control of its activity.

2. The Functions and Features of the Structure of the Innovation System. In general form it is possible to define the function of the innovation system as the assurance of the goal-oriented structure change of technology by means of the formation and use of the potential of development. The generalized function of the innovation system is specified by the set of functions, in which it is possible distinguish three groups.

The functions, which it is possible to call "regular," land in the first group. These functions are implemented in case of the fulfillment of the sequence of procedures:

- the diagnosis of the innovation situation;
- the formation of lists of measures and the choice of the final list;
- the implementation of the list of planned measures;
- the evaluation of the success of the measures;
- the copying of successful measures;
- the making of decisions on the replacement of obsolete technology.

The listed functions, as is evident from their composition, govern the cyclical nature of innovation activity and, accordingly, of the innovation process. The implementation of the "regular" functions in the innovation process is possible only in case of the implementation of the second group of "organizational management" functions:

- the formation and reorganization of the innovation system;
- the distribution of the "regular" functions among the components of the innovation system;
- the monitoring of the fulfillment of the "regular" functions.

Nevertheless the implementation of the listed functions might not ensure the achievement of the ultimate goal of the innovation system--the development of technology. How successfully the innovation system performs this function is determined by the implementation of the third group of functions--the "control" functions:

- the choice and correction of the norms of activity;
- the formation of the innovation climate;
- the formation of the standards of long-range socioeconomic planning;
- the formation of the system of stimulation.

Being a subsystem of social production, which includes people--the subjects of activity, the innovation system should be studied, at least, in three aspects from the point of view of: its composition--the components and the ratios between them; the development in time of the ratio between the components, which forms the innovation process; the interests of the subjects, which are included in the innovation system and are outside it.

Let us examine in sequence the innovation system in each of the named aspects. On the basis of the cited understanding of the functions of the innovation system, it is possible to describe the set of components which are included in it. One should note first of all a distinctive feature of the components of the innovation system--they are extremely diversified: the workers who carry out innovation activity; the set of standards, which regulates innovation activity; the scientific and technical potential, which is materialized in the process of innovation activity. The combination in the innovation system of physical, material, information and activity components creates the basis for its comprehensive study, as well as for the search for various means and methods of purposefully influencing its development, including both material and moral levers and stimuli. In fact any component of the production system can become a component of the innovation system, if it realizes, consciously or unconsciously, by promoting or counteracting, one of the functions of the innovation system.

The presented approach will make it possible in the future to proceed to the formulation of demands on the system of indicators of innovation activity and the innovation process, and then to the formation of the statistics of the innovation process.

3. The Organizational Economic Conditions of the Functioning of the Innovation System. Having characterized the statics of the innovation system and its function, let us proceed to the problem of the improvement of its control, which is understood as the improvement of the parameters of the innovation process from the point of view of closely connected criteria--the time and economic criteria. The time criterion is transformed at the local level in a far from unambiguous manner. The scientific and technical development, which has been fulfilled "at any cost" in the shortest time and lies on the shelf as a consequence of the lack of preparation of the production base for its copying, is not the economy, but the direct waste of labor and time. At the same time the delay with the implementation of a development, which stems from the lack of coordination of management decisions which encompass related cycles of the innovation process, is a controlled variable which can serve as an indicator and criterion of the quality of the functioning of the entire innovation system. Under present conditions, when the implementation of individual innovations affects tens of organizations

(thus, 127 organizations of 29 ministries and departments took part in the development of a new technology of founding; 154 organizations of 30 ministries and departments took part in the production of products of fine organic synthesis),<sup>8</sup> the loss of even a day at every juncture develops into a loss of several months or years.

For the examination of these problems it is necessary to represent the innovation process, which was characterized above in the functional aspect, as a set of actions and activities of individual organizations, workers and collectives, which are carried out under specific external conditions under the influence of (or because of) some internal and external motives and stimuli or others, which reflect the goals and interests of the corresponding subjects. In case of such an approach not the functional block-transformer, but an action becomes the unit of the analysis; the dynamics of the system, the socioeconomic interests operating in it and the forces corresponding to it become the object.

The most exacting definition of the concept "action" is given, so it seems, by R. (Akoff) and F. Emery: "The action of an individual or system (x): an event, which occurs with x and is a potential producer of another event. Thus, an action is an active event, which can entail other changes of either x or its environment."<sup>9</sup> A similar interpretation of action is also given by T. Kotarbinski<sup>10</sup>

For the purposes of the study it is important to single out from the numerous versions of actions the following ones: the reaction of the individual--an event, which happens with him and of which some other event, that is, an action without an alternative, which stems entirely from prevailing internal and external circumstances, acts as the cause; the response of the individual--an event, which happens with him and is coproduced by himself or another event;<sup>11</sup> the initiative action (initiative)--an action carried out spontaneously by the individual.<sup>12</sup>

With allowance made for the foregoing it is possible to give such a preliminary characterization of the most important of the types of actions which are carried out in the innovation system--the innovation action: a rational, goal-oriented response which is responsible for the transition of the innovation to the next phase<sup>13</sup> of its life cycle. A special case of the innovation action is the initiative which gives rise to a similar cycle for some innovation.

The rationality of the innovation action underscores its nontraditional nature, that is, its fulfillment is accomplished not in conformity with the "ritual" forms of behavior, which have been adopted in the given organization. The goal-oriented nature of the innovation action signifies its orientation toward a special result, which is desired by the individual, and not toward the fulfillment of some accepted norm of activity or another. The definition of the innovation action as a response, and not a reaction, indicates the mandatory creative element in the subject of the action and the existence of a set of possible alternatives of behavior at the moment of the choice of one of them. Finally, the transition of the innovation from one phase to other as the result of the innovation action is its content attribute. It is

essential, in our opinion, that such a transition is precisely the result, and not the immediate goal or motive of the innovation action. The latter can be very different and stem both from the place and role of the subject in the organization, the status and objective situation and from his personality traits.

In the entire set of actions, of which the innovation process consists, innovation actions constitute, in essence, a small portion, holding the boundary (initial and final) positions in each phase of it. Hence the importance of innovation actions for the movement of the entire process: if within the phase regulated, traditional actions can be carried out, the inputs and outputs, on which the development of the entire phase also depends, are without fail responses, which are connected with the display of initiative and the making of some decisions or others.

The dilemmas, which arise in such situations, result from the fact that with respect to the broad organizational context every innovation proves to be as if dual: along with the organizations, for which it is favorable and functional, there are also such organizations, which perceive it as dysfunctionally hindering their normal development (from an "internal" point of view). Here from a national economic standpoint the innovation is obviously functional, since otherwise the initial innovation decision would not have been made. The causes of such duality consist, apparently, in the nature of the formal organizational relations, which always fix set, established forms of interrelations, and of the procedures of an informational management nature. The innovation as a response to a change of the needs or the conditions of the functioning of the socioeconomic system "by definition" changes to a greater or smaller extent some of the named relations or others. Hence the coincidence in time of innovation actions primarily with the sphere of informal organizational structures, without which any organization is unviable, is entirely explicable. As is known, informal relations are kinds of "mutations," by means of which the organization makes a search for effective configurations of connections of notification, subordination and coordination in response to a change of the situation in which it develops.

The close connection of innovations with the sphere of informal (more precisely speaking, extraformal)<sup>14</sup> relations in organizations also clarifies the sources of the phenomenon of the reversal of roles in the innovation process. Its content is contained in the well-known expression "every initiative is punishable," that is, it is often suggested to the person, who came forth with one idea or another, to form independently the organizational mechanism of its implementation, performing in succession or simultaneously the roles of an entire group of people, who according to their formal status should (or could) ensure its action. It is easy to see that the temporary reversal of roles is a component, a feature in the process of the formation of the informal situational structure which realizes a specific phase of the innovation process.

The reversal of roles as a method and form of the accomplishment of innovation actions, in spite of its extensive dissemination, cannot be considered an effective means of ensuring the movement of the innovation process. First, the bounds of reversal are limited, as a rule, to the framework of adjoining

hierarchical levels. Second, in case of the substitution of roles the effectiveness of the activity may decrease due to the lack of conformity of the skills, experience and knowledge of the substitute to the demands which are made on this role by its organizational environment. Third, reversal is accompanied by the display of a negative or at best a neutral position of what is being replaced and by a certain opposition on its part to the activity of the initiator, which, of course, does not speed up the course of the corresponding phase of the process. Fourth, in case of the reversal of roles the substitute takes over only a portion of the functions and powers of what is being replaced, of which there may not be enough for the fulfillment of the required innovation action, owing to which it is fulfilled not in the proper amount, half-heartedly or with a slowed speed.

The suggestion to establish a formal organizational structure, of which the implementation of innovation actions would be a function, is often advanced as an effective alternative to the mechanism of the reversal of roles. In our opinion, the considerations cited above force us to doubt the possibility of implementing such an alternative. First, the very fact of the inclusion of innovation activity among the functions and duties of an organization or an individual person gives rise to a specific value orientation toward it as a means of achieving one's own "internal" goals. The path from "I should" to "I want to" passes through the assimilation of the norm and is mediated by the mechanism of sanctions and incentives of the most different content--administrative, economic and moral. The reversal of roles occurs not so much when the formal organizational structure is not equal to the logic and configuration of the innovation process, as in those instances where the sanctions and incentives, which are inherent in a specific role, do not create stimuli and motives for the implementation of an innovation action by the person carrying it out.

Second, the innovation system and its functioning are a specific side, aspect of social reproduction. Owing to this the organizational isolation of the innovation system is inadvisable, since here many important organizational relations will prove to be "ruined." The unity and integrity of the control of the innovation process should find expression first of all in the unity of the criteria of its participants, and not in their subordination to a single organ of management. Thus, the conditions of the implementation of innovation actions at the "entrances" and "exits" of all the phases of the life cycle of an innovation come to the forefront. Among them it is possible to distinguish: 1) social conditions, that is, the existence of various forms of the stimulation (first of all economic stimulation for production innovations) and approval of innovation actions and of the social control of obstacles to the implementation of the latter; 2) information prerequisites, which include the external and the internal (personal) aspects; the former is connected with the availability of information on the innovation situation, the latter is connected with the transfer and the consolidation by instruction and education of knowledge about the social approval and control of innovation actions; 3) the provision of personnel, which presumes the selection and placement in positions, in which innovation actions are carried out, of workers, who are capable of their fulfillment and have the appropriate knowledge, skills, motivations and value orientations toward innovations; 4) organizational prerequisites, that is, the distribution of rights and duties in formal

organizational structures, which facilitate the action of the mechanism of the reversal of roles; the principles of situational control within organizations and the broadening of the independence of economic units satisfy this condition.

The sequence of the listing of the conditions of the implementation of innovation actions also expresses here their importance for the increase of the efficiency of the functioning of the entire innovation system. At the same time their interconnection--the isolated implementation of some one condition--will not make it possible to use all the reserves of growth, which are connected with this. The unity of the management of scientific and technical progress should also find expression exactly in the assurance of the coordination of the influence of the indicated conditions on the innovation process.

An extensive set of measures, which encompasses practically all of the distinguished conditions, is outlined in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy."<sup>15</sup> In it the increase of the interest of production organizations in technical innovations, the improvement of the stimulation of scientific research and planning and design subdivisions, managers and engineering and technical personnel, the creation of temporary (program) organs of the management of the solution of scientific and technical problems and the improvement of planning work in the direction of the assurance of the greater unity of the innovation and investment processes, including the specification of the procedure of their financing, are envisaged and a number of specific priority directions of scientific and technical progress are specified. The timely fulfillment of this decree to the full extent, undoubtedly, will increase the efficiency of the functioning of the entire innovation system and will improve the conformity of its operation to the tasks of the socioeconomic development of our country at the stage of its intensification.

#### FOOTNOTES

1. "Materialy Plenuma Tsentral'nogo Komiteta KPSS, 14-15 iyunya 1983 g." [Materials of the CPSU Central Committee Plenum, 14-15 June 1983], Moscow, 1983, p 9.
2. "Problemy narodnokhozyaystvennogo planirovaniya" [Problems of National Economic Planning], N. P. Fedorenko and Ye. Z. Mayminas, editors in chief, Moscow, 1982, p 218.
3. Yu. V. Yaremenko, "Strukturnyye izmeneniya v sotsialisticheskoy ekonomike" [Structural Changes in the Socialist Economy], Moscow, 1981, p 62.
4. "Problemy innovatsii i eksperimentiki. Materialy seminara" [Problems of Innovation and Experimentation. Materials of a Seminar], Tallinn, 1979.

5. "Struktura innovatsionnogo protsessa" [The Structure of the Innovation Process], Moscow, 1981; "Problemy innovatiki i eksperimentiki," Tallinn, 1981.
6. See V. L. Tambovtsev, "Analiz tseley v upravlenii obshchestvennym proizvodstvom" [The Analysis of Goals in the Management of Social Production], Moscow, 1982.
7. See A. I. Prigozhin, "Interorganizational Role Positions in the Innovation Process," "Struktura innovatsionnogo protsessa," Moscow, 1981, p 23.
8. PLANOVOYE KHOZYAYSTVO, No 12, 1978, p 73.
9. R. (Akoff) and F. Emery, "On Goal-Oriented Systems," Moscow, 1974, p 2
10. See T. Kotarbinski, "Treatise on Good Work," Moscow, 1975, pp 34-42.
11. See R. (Akoff) and F. Emery, "On Goal-Oriented Systems," pp 34-35.
12. See T. Kotarbinski, "Treatise on Good Work," p 129.
13. We will call the stage or its part, which is accomplished in a specific economic or scientific research (planning) organization or in any of their subdivisions, the phase of the innovation process.
14. See A. I. Prigozhin, "Sotsiologiya organizatsiy" [The Sociology of Organizations], Moscow, 1980, p 111.
15. PRAVDA, 28 August 1983.

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GENERAL

SCIENTIFIC, TECHNICAL PROGRESS IN LIGHT OF LENIN'S IDEAS

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[Article by Doctor of Economic Sciences V. Pokrovskiy: "Current Problems of the Introduction of New Equipment and Technology in Light of Lenin's Ideas"; passages rendered in all capital letters printed in italics in source]

[Text] V. I. Lenin inseparably connected the building of socialism and the subsequent transition to communist society with the development of science and technology and with the use of their achievements. When preparing the first Party Program he indicated that socialism "is based on all the material of human knowledge, presumes the great development of science...."

In his works V. I. Lenin revealed the advantages of socialism in the development and use of the most advanced achievements of science and technology. The subordination of the development of science and technology to the interests of all of society, the systematic management of the national economy, the possibility and necessity of the pursuit of a unified scientific and technical policy and the interest of the working people in the use of new equipment are these advantages.

In revealing the antagonistic nature of the use of the achievements of science in production under capitalism, V. I. Lenin in the article "The Scientific System of the Wringing of Sweat" wrote that "the progress of technology and science signifies in capitalist society progress in the art of wringing sweat,"<sup>2</sup> of obtaining from the worker threefold more labor, of exhausting mercilessly all his strength and of sucking out with tripled speed every drop of nervous and muscular energy of the hired slave.<sup>3</sup>

Under socialism the results of scientific and technical progress are the property of all the working people. The use of its achievements in production not only ensures the more complete meeting of the needs of all members of society, but also promotes the facilitation of working conditions and the creation of opportunities for the all-round development of man. In the article "One of the Great Triumphs of Technology" V. I. Lenin, in particular, wrote that "the electrification... of all factories and railroads will make working conditions more sanitary, will save millions of workers from smoke, dust and dirt, will hasten the conversion of dirty disgusting workshops into clear, bright laboratories worthy of man."<sup>4</sup>

After the triumph of the Great October Socialist Revolution V. I. Lenin, in elaborating specific means of the development of the new society, noted in particular that socialism requires the development of "equipment which has been built according to the latest of modern science...."<sup>5</sup>

Historical experience completely confirmed the perspicacity of Lenin's teaching on the efficient use, in the interests of all the working people, of scientific and technical achievements in the building of communism. At the present stage, when the transition is being made to the primarily intensive type of development of production, a most important role belongs to the extensive use of new equipment and technology.

Science has already done much to speed up the development of the national economy of our country. With each year the number of scientific and technical measures being implemented is increasing: during 1971-1975 2.7 million of them were implemented in industry, during 1976-1980--3.4 million. The implementation of these measures ensured the derivation of a profit in the amount of 12.2 billion rubles and 14.7 billion rubles respectively. During the first 3 years of the current five-year plan more than 2 million scientific and technical measures were introduced, owing to which a profit of more than 10 billion rubles was derived. The fact that their payback period (2.9 years) is considerably less than the standard payback period of capital investments (6.6 years), in particular, attests to the great effectiveness of such measures. During the decade of 1971-1980 67 percent of the increase of labor productivity in industry was provided by means of the introduction of new equipment and the implementation of measures on the scientific organization of labor, during 1981-1983 this increase came to more than 90 percent.

The modern achievements of science and technology are making it possible to elaborate and develop equipment and production technology, which ensure not only the increase of labor productivity, but also the substantial decrease of the expenditures of materials, fuel and energy. For example, the fulfillment during the current 5-year period of 170 programs, which are aimed at the solution of the most important scientific and technical problems, the development and bringing up to introduction in production of new equipment, technological processes and materials, should provide an economic impact in the amount of about 16 billion rubles and save 4 million tons of ferrous metals, more than 50 million tons of conventional fuel and 14 billion kWh of electric power. The measures outlined in the programs will save the labor of about 3 million people.

The organization of the introduction of new equipment (technology), on the one hand, and the conditions necessary for this, on the other, are interconnected. Here organization is the more active component of the process of the introduction of new equipment (technology), although without the creation of the appropriate conditions this process is complicated substantially.

In improving the process of the organization of the introduction of new equipment (technology), one should proceed from the fact that, first, introduction is all the same one of the stages (although also a very important one) of the life cycle of equipment and the acceleration of scientific and technical progress; second, the introduction of new equipment is not an end in

itself, but a means of achieving high end results of social production. In the work of V. I. Lenin "A Draft of a Plan of Scientific and Technical Work," which was written in 1918, the most important principles of the distribution of the productive forces of the country, which make it possible to use most efficiently raw material, fuel and energy resources and to organize production efficiently and ensure the minimum losses of labor during the transfer of objects of labor from some stages of processing to others up to the obtaining of the finished product, are specified.<sup>6</sup> Economic science is called upon to play a special role in the acceleration of scientific and technical progress. "...The economist," V. I. Lenin wrote, "should always look ahead, in the direction of the progress of technology, otherwise he will immediately find himself behind..."

When solving the problem of the acceleration of scientific and technical progress it is now already impossible to confine oneself only to the development and introduction of new equipment, it is necessary to actively influence the efficiency of the production (copying) and use (operation) of equipment, including the process of its removal from production.

A few years ago several steps were taken in the direction of the planning of the removal of obsolete equipment from production. However, in practice this problem is in many ways still being solved formally. The planning of "removal" is nothing but an attempt to influence by the plan the updating of equipment, which is often carried out in isolation of its life cycle as a whole, at times without allowance made for the economic consequences of the removal of a product from production and, what is the main thing, the efficiency of the use of the equipment which has come to take the place of the removed equipment. As a result the output of equipment in a number of cases increases more rapidly in value terms than in units of power.

The systematic process of updating equipment should be based not on the subjective ideas of managers of one level or another, but on the objective analysis and forecast of the prospects of its introduction, as well as the scale of use, including the gradual removal from use of obsolete equipment. Here it is appropriate to recall what great attention V. I. Lenin devoted to the questions of the prospects of the development of the economy. The first scientific plan in history of the development of national economy of the country for the long-term future--the plan of the electrification of Russia (the State Commission for the Electrification of Russia)--was drawn up in the early 1920's under his immediate supervision. At that time the beginning of the comprehensive approach to the planning of the development of electric power engineering in conjunction with the development of all the sectors of the national economy had already been marked. The plan was aimed at the assurance of the economic independence of the country, the development of large-scale mechanized industry and the updating of the technical base of production on the basis of electrification. The experience of the formulation of the first plan, which was fulfilled ahead of time with respect to the basic indicators, played subsequently an invaluable role when drawing up five-year and other long-range plans.

Now many shortcomings in the area of the more complete and efficient use of scientific and technical progress are due to a noncomprehensive, narrow

departmental approach to the solution of specific problems of the development, introduction and use of new equipment and the poor orientation toward the strategically important prospects of the functioning of the unified national economic complex. The assets, which are being allocated for the development of the scientific and technical potential, are still not being concentrated to the proper degree. The analysis of the themes of scientific and technical development shows that 35 percent of the themes have an estimated cost of less than 20,000 rubles (and this, as a rule, is a manifestation of the study of minor themes), only a third of the developments being introduced in production are based on inventions.

The inadequate influence of the achievements of science and technology on the most important components of production efficiency--the decrease of the power-output and materials-output ratio of products and the increase of labor productivity--is a consequence of this.

It is well known that in recent years the fuel and power balance of the country has become very strained. However, the problems of improving the use of energy resources on the basis of scientific and technical achievements are still being solved slowly in the sectors of the national economy. The construction of heavy-duty electric power lines is being delayed, the assignments on the decrease of the level of losses of electric power in electric networks are not being completely fulfilled. Many mass demand items, which are produced in our country, prove to be excessively power-consuming, while the materials-output ratio of several types of produced and used equipment considerably exceeds the optimum values from the point of view of the modern achievements of science and technology.

It has been confirmed by practice, for example, that the production of 1,000 tons of items by the method of powder metallurgy instead of the traditional technology provides a saving of up to 2 tons of rolled products per ton of parts, at the same time on the average 190 people and 80 units of metalworking equipment are freed. However, the output of items made from metallic powders is still inadequate, while from the capital investments allocated by the state the sectors cannot find assets for the development of this advanced process.

These examples and ones similar to them, which it is easy to cite, testify that much work still lies ahead on the comprehensive implementation of Lenin's ideas on the effective concentration, which is inherent in socialism, of resources on the most important, most promising directions of scientific and technical progress within the systematically determined economic policy.

It is well known what enormous importance V. I. Lenin attached in the matter of building communism to the utmost increase of labor productivity and to the better use of manpower resources. "Communism," he stressed, "is the higher labor productivity, as against capitalist labor productivity, of voluntary, conscious, united workers who used advanced equipment."

The decrease of manual, low-skilled labor is one of the most urgent problems of the efficient use of manpower resources.

At present more than 50 million people are engaged in manual labor in the national economy. The rapidly expanding use of industrial robots is playing an important role in the sharp reduction (and, in the future, also the elimination) of workplaces, which require manual, low-skilled and monotonous labor and presume work under conditions which are difficult and harmful to the health. According to the calculations of specialists, the introduction of robots and the expansion of the production of means of small-scale mechanization, machines and mechanisms for ancillary production will make it possible to eliminate up to 60 percent of the manual jobs. The assignments on the production and introduction of robots are being significantly exceeded; by the end of the five-year plan 40,000 robots should be in operation in the country. However, the introduced advanced equipment is not always being used satisfactorily. According to the data of one-time studies of the USSR Central Statistical Administration, in machine building, for example, a significant portion of the equipment, which is complete with robots, is not operating, the shift coefficient of this equipment is lower than for metalworking equipment as a whole. The advantages of NC machine tools, which are frequently used for the machining of mass parts, where they do not have advantages as compared with less expensive equipment, are also not being completely realized.

In practice the low utilization ratio of new, advanced equipment is equivalent to the need for the creation of new workplaces. This does not satisfy the requirements of scientific and technical progress, especially in the currently formed demographic situation. Under such conditions the increase of the skill of workers is not stimulated and, what is the main thing, the further increase of capital investments for capital construction is required. A paradox emerges: the most modern, most advanced equipment for a greater part of the time is idle, while along with this nearly 40 percent of the workers do manual labor.

The questions of the complete use of advanced expensive equipment are inseparably connected with the problems of the intensification of social production and the increase of its efficiency. In their solution priority should belong to economic methods of influencing first of all the users of new equipment. At present the inclusion in the plan of measures on new equipment is frequently regarded by managers of all levels simply as a regular "assignment," the nonfulfillment of which on time entails some sanctions or others. If you also take into consideration the fact that for industrial enterprises the assets, which are invested in the purchase of the latest equipment, in most cases are not "their own," "hard-earned" assets, when settling the question: Should a new item be taken or not? frequently by no means economic criteria prevail. Most often either the desire to have a "good" plan or the incorrectly understood prestige of the enterprise acts as these criteria.

It seems that at the present stage in light of Lenin's ideas THE SINGLING OUT FROM THE ENTIRE AMOUNT OF SCIENTIFIC AND TECHNICAL MEASURES OF THE MOST IMPORTANT ONES, WHICH IN THE FUTURE WILL YIELD A SIGNIFICANT NATIONAL ECONOMIC IMPACT, is the starting point of the organization of the introduction of new equipment (technology). Given such an approach Lenin's instructions on the link, which it is necessary to grasp in order to put out the entire chain, are realized.

At present nearly 800,000 measures on new equipment with a total impact of more than 4.4 billion rubles are introduced annually. However, on the average each of these measures provides an impact of less than 6,000 rubles and does not ensure the freeing of even a single worker. In other words, in many cases these are, as was already said, minor measures which do not have a substantial influence on the efficiency of social production as a whole. Among the annually used tens of thousands of inventions (that is, scientific and technical achievements of the highest level) only a little more than 4 percent provide a major impact--100,000 rubles and more. Meanwhile precisely the use of these highly efficient inventions (let us call them base inventions) provides nearly two-thirds of the total economic impact from the use of all inventions in the national economy. Among the base scientific and technical measures the latest technologies play an especially important role. Researchers are more and more definitely coming to the conclusion that THE RATE OF SCIENTIFIC AND TECHNICAL PROGRESS UNDER PRESENT CONDITIONS IS DETERMINED FIRST OF ALL BY THE SPEED AND SCALE OF THE DISSEMINATION OF NEW TECHNOLOGIES FOR INTERSECTORIAL USE, such as welding, powder metallurgy, laser technology, coatings, explosion technology, robotics, plasma machining, the methods of the complete processing of raw materials and so forth (it is natural that their use is possible in combination with equipment which ensures the implementation of the technologies at the specific works).

Statistics confirms that the introduction of fundamentally new technology, which "lives," as a rule, considerably longer than machines and items, yields as compared with them substantially better economic results. For example, in such subsectors of the electrical equipment industry as the production of low-voltage equipment and semiconductor rectifiers, in which radical changes have occurred in the technology, the growth rate of the economic impact from the increase of the technical level of production over more than a 10-year period was two- to fourfold greater than for the sector as a whole.

Not by chance in recent years has our technical policy been oriented more and more toward a high rate of the use of new technologies, while the main directions of their improvement are: the changeover to types of technology with few operations, waste-free and low-waste types of technology; the further reinforcement of the unit powers of technological equipment; the acceleration of technological processes and their optimization; the more extensive use in them of highly efficiently catalytic reactions, extreme conditions and conditions close to them; the increase of the level of the electrification and chemicalization of production; the introduction of technological processes, which ensure the continuous updating of products and the increase of their quality.

The adaptation of the system of the organization of the management of the introduction of the achievements of science and technology to the conditions of the scientific and technical revolution, as we have already noted, first of all presumes the choice of the most promising and significant scientific and technical achievements. Of course, the problem of such a choice has always existed in one form or another. However, its solution was oriented mainly toward the distinction of the priority directions of the development of science and technology. Now it is a question not only of the directions of scientific and technical development, but also of THE CHOICE OF SPECIFIC MAJOR

(BASE) SCIENTIFIC AND TECHNICAL INNOVATION, which over a long time will be purposefully introduced in various spheres of social production. It is necessary to reject the principle "everything that has been developed should be introduced in practice," the competition of ideas should be used more extensively, keeping in mind that the expenditures at the subsequent stages of the life cycle of equipment are many times greater than the outlays for its development, no matter how significant the latter were. Such an approach will make it possible to distribute more efficiently, from the standpoint of the future, the resources which are allocated for scientific and technical development. Here the long-term distribution of resources should be carried out not by the "boiler" method, but should be connected both with the thematic directions and with individual major jobs.

So far the priority of economic and social goals with respect to major (base) scientific and technical innovations has not been set down in guiding or procedural materials, enforceable enactments or sets of plan assignments. And although an attempt to solve this problem was made during the elaboration of versions of the comprehensive program of scientific and technical progress for the long-term future, the importance of the majority of conclusions and recommendations of this program was weakened due to intersectorial and interdepartmental conflicts, which have remained unsurmounted, and the inadequate precision in the setting of priorities. The planning and financial, organizational and economic levers of influence on the effectiveness of measures on scientific and technical progress have also remained nearly unchanged. Meanwhile here it is especially important to implement extensively and fruitfully Lenin's ideas of the preferable material stimulation of the most valuable efforts for society, which yield the necessary results.

At present, when the concept of the economic and social development of the country to 2000 is being formed, and the decision on the formulation by the joint efforts of the CEMA member countries of the Comprehensive Program of Scientific and Technical Progress for 15-20 Years has also been made, it is necessary to take fully into account the positive and negative lessons of the implementation of the Comprehensive Program of Scientific and Technical Progress which is now in effect. When planning scientific and technical development it is necessary to proceed from the fact that the decisions, which are made today, will be implemented in practice in subsequent years. This will require specific capital investments: every ruble, which is spent on the development and assimilation of new equipment, will entail after several years the expenditure of tens of rubles on the organization of the production and the use of this equipment, and the impact from its use will not always appear immediately. Hence follows the need for the thorough planning study of the coming structural changes in production and the determination of their economically sound scale. The making of decisions on base scientific and technical innovations should be carried out with allowance made for the coming development of the national economy for the future of 15-30 years and should be oriented first of all toward economic indicators which are based on the comparison of the expenditures and the obtained results. At the same time it is necessary to plan (with allowance made for the priority) the scale and spheres (sectors) of the dissemination of these innovations. While stressing that the planned management of the economy is fundamentally inherent in the

building and development of socialism, V. I. Lenin wrote: "Socialism is inconceivable... without a planned state organization which subordinates tens of millions of people to the most strict observance of a unified norm in the matter of the production and distribution of products."<sup>9</sup>

Thus, the role of planning, which is based on the clearly formulated social order of society for the future, and the role of state monitoring of the standardization of the equipment being used and the technical level of items and production are increasing sharply in the introduction and the efficient and timely use of base scientific and technical innovations.

The still existing nonoptimality of the scale of the use of new equipment, its many types and "disunification," which decrease the series nature of production, the groundlessness of the parametric series of equipment and the existence of items, which are identical in purpose, are doing significant economic harm to the national economy. The solution of the problems of accelerating scientific and technical progress requires the formulation of such plans, which would combine fundamentally the current needs of the national economy and the prospects of its development on the basis of the intensification of production. The transition from the planning of individual stages of the life cycle of scientific and technical innovations, especially base innovations, to the planning of the entire set of operations connected with the realization of this system is necessary. This presumes the substantial increase of the role of the evaluations of the spheres of use of new equipment, the assurance of its priority channeling into the sectors, in which it yields the greatest impact, and an orientation toward the accomplishment of advanced structural changes in production on the basis of the latest equipment and technology. The combined organization of the operations, which are connected with major base scientific and technical innovations, makes it possible, while avoiding formalism, to accumulate knowledge and experience for the fulfillment of pioneering operations, which yield a large economic impact, and to shift assets.

Stimulation, as has already been said, is an important component of the organization of the introduction of new equipment (technology). K. Marx and F. Engels wrote that the "idea" invariably shamed itself as soon as it was separated from "interest."<sup>10</sup> At present in the sphere of the development of science and technology interests are connected first of all with the fulfillment of short-term themes and operations, which provide the opportunity to receive the bonus more rapidly and relatively greater amounts of it.

In our opinion, the incentive system in the sphere of science and technology should be connected with three groups of factors. FIRST, the current payment of bonuses should stimulate the fulfillment and the exceeding of the plan assignments, the decrease of the number of workers and the better quality of labor. SECOND, it is necessary to stimulate the achievement of a high scientific and technical level of developments (it can be evaluated after their completion in accordance with the results of acceptance). THIRD, the massiveness of the use of the results of developments should be stimulated subject to the achieved economic impact, and the maximum level of the stimulation of major developments should not be limited. It should include the stimulation of the organizations, which developed them, and the incentive

of the immediate developers. Here the workers, who are employed at the stages of the industrial assimilation and especially the use of new equipment, should be covered by the system of stimulation. Thus, on the one hand, the economic interest of the manufacturing enterprises (first of all their managers) in the output and the rapid introduction of new equipment, and on the other, the responsibility, including personal responsibility, of the clients who are the users of the new equipment for how the results of scientific and technical achievements are actually being implemented, are necessary. The losses, which are due to the poor use of new equipment by the user, should be reimbursed from the economic stimulation fund of the corresponding enterprises and organizations.

One should also resort to additional forms of the stimulation of large-scale measures on the use of new equipment in production. For example, the workers of the enterprises, which received the name of enterprise of high quality, could receive for a specific period increments for the wage fund.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," which was adopted in 1983, is aimed at the assurance in the next few years by industry of the output of machines, equipment, instruments, materials and other products, which conform to the best models. The implementation of the measures envisaged by it is creating a climate of the greatest favoring of the introduction of new equipment and technology.

The leading development of machine building and its orientation toward the introduction of equipment of the highest world level are the most important condition of the implementation of the CPSU policy of the intensification of social production. The solution of the problem of the increase of labor productivity and the increase of the efficiency of the economy is impossible without this.

The new equipment, which is being produced by machine builders, is being introduced mainly by means of capital construction (for example, in the electrical equipment and chemical industries--nearly 80 percent) and to a smaller extent by retooling. Therefore the effectiveness of capital construction and retooling is one of the most important conditions of the introduction of the latest scientific and technical achievements. The major shortcomings, which exist in the organization of construction (the long period of the building of new projects, the dispersal of investments, the poor attention to the renovation and retooling of production), are a hindrance to scientific and technical progress. In connection with the long period of the construction of many (especially large) projects there are frequent instances when the new equipment, which was incorporated when drawing up the plans, by the time of its placement into operation is already becoming obsolete and lags in technical and economic parameters behind the world level. It is expedient in this connection to broaden the powers of ministries and departments, having given them the right if necessary during the implementation of the plans of new construction to make in them changes which ensure the increase of the technical and economic level of products and technological processes.

Experience in the planning of construction projects for versatile (still just being formed) technological processes has been gained in our country. This is leading in a number of cases to some increase of the cost of construction, but is making it possible to include fundamentally in the planned technological lines equipment which is being newly developed, ensuring thereby the acceleration of the achievement of high technical and economic characteristics. The use of such a method of planning should be expanded.

Several sectors are attempting to solve the problems facing them by the construction of new projects and are decreasing the share of capital investments for retooling and renovation. Meanwhile in the majority of processing sectors, and first of all in machine building, an overwhelming portion of the capital investments should be channeled into the retooling of operating enterprises. It is necessary to allocate assets for new construction only if the increase of production by means of the expansion of the available capacities is impossible. The clear orientation of the plans toward the retooling of production is the most important condition of the introduction of new equipment and technology.

As is known, the quality of the output being produced is governed, with rare exception, by the technical level of operating enterprises, and not of enterprises being newly put into operation. Practical experience attests that the retooling and renovation of operating enterprises is much more effective than new construction: at enterprises being renovated labor productivity is 1.5-fold greater, while the output-capital ratio is nearly twofold greater as compared with projects being newly built.

In the process of formulating the drafts of the plans for the 12th Five-Year Plan, in our opinion, one should DETERMINE THE SPECIFIC ENTERPRISES WHICH REQUIRE PRIORITY RETOOLING AND RENOVATION, create the conditions for the maximum concentration of forces and assets on the updating of the active portion of the fixed capital of sectors and ensure the use of advanced methods of the organization of the operations on renovation and retooling, which will make it possible to shorten the time of their fulfillment.

Other conditions, in addition to those already named, of the acceleration of the introduction of new equipment and technology are, first, THE INCREASE OF RESERVE CAPACITIES, which create opportunities for economic shifting, the delivery to the works of new equipment and the enlargement of the assortment of output being produced, that is, for the solution of the problems of "introduction" in the broadest sense of this word; second, THE EXISTENCE AND FURTHER DEVELOPMENT OF THE SCIENTIFIC AND TECHNICAL INFRASTRUCTURE, including pilot works (at present in the leading sectors of machine building the backing of the needs with these works ranges from 40 to 60 percent), scientific equipment rental centers, pilot bases and collective-use computer centers; third, THE FURTHER INTENSIFICATION OF LABOR IN THE SPHERE OF SCIENCE both by the increase of the level of its technical equipment and by means of the better stimulation of outstanding achievements, the increase of the effectiveness of the competitive system and the certification of personnel, their selection, the formation of temporary collectives of the developers of specific themes; fourth, THE FURTHER DEVELOPMENT OF THE CONCENTRATION OF

PRODUCTION, which increases the possibilities of the formulation and introduction of scientific and technical measures.

It is also necessary to use more extensively the experience, which exists in several sectors (for example, in tractor, agricultural and chemical machine building), of the organization of powerful sectorial technological centers, which include scientific research, design, technological, planning and other subdivisions and pilot bases. The establishment of such centers makes it possible not only to develop new technological processes more efficiently, but also to ensure their implementation, to give assistance to enterprises and associations of the sector in the introduction of new technologies, to make improvements in the process of their use and so on. Such centers in practice determine the technical and the technological levels of production in sectors and ensure mobility in the assimilation of new equipment. The products of these centers are new technological decisions and technological equipment, including nonstandard equipment, which has been developed on its basis and on the basis of which the long-range problems of the retooling of the corresponding sectors are being solved.

Such experience should also be extended to the organization of operations on the rapid introduction of fundamentally new technologies for intersectorial use. The solution of this problem, in our opinion, requires the uniting of the efforts of the State Committee for Science and Technology of the USSR Council of Ministers, the USSR State Planning Committee and the USSR Academy of Sciences: the organizations of the Academy of Sciences could focus attention on the search for fundamentally new advanced technologies for intersectorial use, while the USSR State Committee for Science and Technology and the USSR State Planning Committee could ensure the supervision of the process of their development and the establishment of the corresponding integral systems of machines and the extensive stage-by-stage dissemination of these systems.

With allowance made for the experience, which exists in Bulgaria, the State Committee for Science and Technology of the USSR Council of Ministers should, in our opinion, be granted the right to establish in its system INTERSECTORIAL TECHNOLOGICAL CENTERS (as a rule, after the pattern of scientific production associations), to which there should be assigned the development and extensive introduction in production of the most advanced resource-saving technologies for intersectorial purposes. In consultation with the USSR State Planning Committee scientific subdivisions and production enterprises REGARDLESS OF THEIR DEPARTMENTAL SUBORDINATION can be included in them. For the intersectorial scientific production associations, which are being established (including on a shared basis), there should be earmarked by special-purpose allocation capital investments which are backed by a limit of contractual operations.

Back during the first years of Soviet power V. I. Lenin wrote: "...socialism requires conscious and mass movement forward to the highest labor productivity as compared with capitalism and on the basis of what has been achieved by capitalism. Socialism should IN ITS OWN WAY, by its own methods--let us say more specifically, by SOVIET methods--accomplish this movement forward."<sup>11</sup> These words of Lenin sound especially urgent now, when the changeover of the

national economy to the means of intensification is being accomplished, and a task of key importance is "to mobilize the organizational efforts and physical assets, which are necessary for the quickest retooling of all the sectors of the national economy, for the rapid assimilation in production of the most advanced technologies."<sup>12</sup> Under these conditions the improvement of the methods of the organization of the introduction of new equipment and technology is becoming, in complete conformity with Lenin's ideas, the most important factor of the increase of the efficiency of social production.

#### FOOTNOTES

1. V. I. Lenin, "Poln. sobr. soch." [Complete Works], Vol 6, pp 362-363.
2. V. I. Lenin, "Poln. sobr. soch.," Vol 23, p 19.
3. Ibid., pp 18-19.
4. Ibid, p 94.
5. V. I. Lenin, "Poln. sobr. soch.," Vol 36, p 300.
6. See V. I. Lenin, "Poln. sobr. soch.," Vol 36, p 228.
7. V. I. Lenin, "Poln. sobr. soch.," Vol 5, pp 137-138.
8. V. I. Lenin, "Poln. sobr. soch.," Vol 39, p 22.
9. V. I. Lenin, "Poln. sobr. soch.," Vol 36, p 300.
10. K. Marx and F. Engels, "Soch." [Works], Vol 2, p 89.
11. V. I. Lenin, "Poln. sobr. soch.," Vol 36, p 178.
12. K. Chernenko, "To the Level of the Requirements of Mature Socialism. Some Urgent Problems of the Theory, Strategy and Tactics of the CPSU," KOMMUNIST, No 18, 1984, p 11.

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GENERAL

PRAVDA READERS ON ENCOURAGING TECHNICAL PROGRESS

[Editorial report] Moscow PRAVDA in Russian 3 April 1985 First Edition carries on page 2 under the heading "Controlling Interests; Survey of Readers' Responses to the Publication 'From Design to Introduction'" a 2,500-word article by O. Mikheyev which reviews readers' letters in response to the editorial office's request for their opinions "on the reasons which are holding back scientific-technical progress in the national economy" and their proposals on "how to accelerate the introduction of innovations."

Mikheyev cites readers' view that "indicators characterizing the renovation of production and output should play not secondary but primary roles" and notes that the majority consider that "the problem of accelerating scientific-technical progress should be examined in a package together with the overall improvement of the planning and management of the national economy."

Mikheyev emphasizes that "new elements are not introduced because the enterprises themselves have little interest in the matter." He goes on to cite a reader's opinion that "enterprise collectives must be given real independence" and that "imposing 'innovations' from above will not produce an effect without reliance on the initiative of the labor collectives themselves." The article also quotes from the letters of readers who consider that enterprises leaders as well as inventors should have a material interest in the introduction of innovations.

The second part of the article quotes readers' ideas for creating a special body responsible for the introduction of the most important innovations. "The majority of readers also support the idea of creating specialized firms responsible for introduction and the all-round development of experimental and trial production." However, Mikheyev points out, one reader believes that "the creation of numerous organizations responsible for organization and would divert many working hands and resources."

Finally Mikheyev agrees with readers who believe in the importance of seeking "an economic mechanism, organizational structures, and methods of administration which take the maximum account of the role and importance of the human factor in the economy and lead people's economic interests and conduct."

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GENERAL

## SCIENTIFIC ACTIVITY IN UKRAINIAN HIGHER EDUCATION

Moscow VESTNIK VYSSHEY SHKOLY in Russian No 2, Feb 85 pp 33-39

[Article by Ukrainian SSR Deputy Minister of Higher and Secondary Specialized Education Professor V. I. Kostyuk and Candidate of Technical Sciences N. N. Sakhno of the Ukrainian SSR Ministry of Higher and Secondary Specialized Education: "Scientists of the Higher Educational Institutions of the Ukraine for the National Economy"]

[Text] In the Ukrainian SSR higher educational institutions, at which about half of all the scientists of the republic work, while the amount of research performed annually comes to hundreds of millions of rubles, are playing an important role in the solution of urgent problems of scientific and technical progress.

In conformity with the decisions of the 26th CPSU Congress and the decrees of the CPSU Central Committee and the USSR Council of Ministers "On the Increase of the Efficiency of Scientific Research Work at Higher Educational Institutions" (1978) and "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" (1983) the Ukrainian Ministry of Higher and Secondary Specialized Education and its educational institutions have implemented a set of measures, which are aimed at the development of research activity, the increase of its efficiency, the acceleration and the broadening of the scale of the introduction of completed developments in the national economy. Considerable attention is being devoted to the inclusion of the developments of higher educational institutions in the goal programs of various levels; as a result the share of the most important themes comes to nearly 70 percent. The amount of research as compared with 1975 has increased by nearly twofold.

A number of discoveries have been made with the participation of scientists of higher educational institutions, many works have been awarded USSR and Ukrainian SSR State Prizes. During the years of the 11th Five-Year Plan a large number of certificates of authorship and patents have been obtained, several licenses have been sold. Thousands of completed works are being introduced in production.

The need for the substantial shortening of the time and the broadening of the scale of the introduction of scientific and design developments in practice is

indicated in the decisions of recent CPSU Central Committee plenums and decrees of the party and government. The corresponding organizations when drawing up the plans should proceed from the fact that in the next few years industry should ensure the output of products, which conform in their indicators of the best current models, as well as the introduction of advanced technological processes, on this basis labor productivity in the national economy will be increased substantially.

In this connection the examination of the measures, which have been implemented by the republic Ministry of Higher and Secondary Specialized Education and higher educational institutions, on the increase of the efficiency and the acceleration of the introduction of completed works in the national economy, as well as the analysis of the existing difficulties and problems are of definite interest.

The analysis of the developments, which were completed during the 10th Five-Year Plan, the determination of the means of their implementation and the drawing up of long-range plans of introduction are of great importance. These questions became a topic of special consideration at the meeting of the Commission of the Presidium of the Republic Council of Ministers for Scientific and Technical Progress and in the Ukrainian State Planning Committee. As a result a number of decrees, including on the broadening of the use of the advanced technological processes, which have been developed at higher educational institutions, the increase of the contribution of scientists of higher educational institutions to the accomplishment of the Food Program, the increase of the efficiency and the development of research at individual higher educational institutions and others, were adopted and are being implemented. The development among higher educational institutions of socialist competition (on the initiative of Kharkov and Donetsk polytechnical institutes and the Dnepropetrovsk Metallurgical Institute, which received the endorsement of the Ukrainian CP Central Committee) under the motto "The Creative Alliance of the Higher School and Production in the Service of the Five-Year Plan" is also contributing to the improvement of the use of the scientific potential of higher educational institutions.

The constant analysis of completed works, the coordination with interested organizations of the questions of the use of their results and the drawing up and implementation of annual and long-range plans of introduction were introduced in the practice of the work of higher educational institutions starting in 1975. The constant checking of the fulfillment of these plans and the improved contacts with sectors enabled the higher educational institutions to achieve a noticeable shortening of the research-development-introduction cycle and to increase the share of the works, which were introduced in the year of completion and a year later. The trips of representatives of the higher educational institutions to the enterprises, where the developments are being introduced and the identification and elimination jointly with production workers of arising difficulties and bottlenecks are taking place, were useful here.

The 10th and 11th Five-Year Plans are characterized by the further improvement of the organizational work of higher educational institutions in the area of the introduction of the results of research. In conformity with a decision of

the collegium of our ministry at the majority of higher educational institutions introduction and economic efficiency services (SVE's) have been set up within the scientific research sectors (sections). The Ministry of Higher and Secondary Specialized Education generalized the experience of the work of these services and prepared special procedural information materials in order to ensure the further stepping up of the activity of the introduction and economic efficiency services and to promote the acceleration of the inclusion of the most significant developments of higher educational institutions in the plans of introduction. The greatest success was achieved by those higher educational institutions, which in conformity with the posed task of the introduction and economic efficiency services are ensuring the organizational procedural supervision of subdivisions in questions of the introduction of the results of scientific research work; are organizing the drawing up and implementation of plans of the introduction of completed developments, striving for the priority inclusion in these plans of works, which are of great national economic importance, as well as are protected by certificates of authorship; are giving the performers of themes procedural assistance in questions of the calculations of the economic efficiency of research at all the stages of its conducting and the drawing up of technical and economic substantiations, are seeing to it that the obligations of the parties on the implementation of developments would be included in the terms of contracts, as well as are helping the performers to draw up contracts for the transfer of scientific and technical achievements and are monitoring the progress of their introduction; are participating in the organization and work of interdepartmental and state commissions for the testing and acceptance of completed scientific and technical developments; are preparing suggestions and are taking part in the coordination of the plans of introduction with sectorial ministries, departments, enterprises and organizations; are selecting suggestions on completed works, which are of great national economic importance and require the assistance of the Ukrainian SSR Ministry of Higher and Secondary Specialized Education in the solution of the problems of their introduction.

The approval of the statute on such a service should be expedited for the further increase of the effectiveness of the work of the introduction and economic efficiency services. The tasks and functions of these services, their structure and the number of workers subject to the amounts and specific nature of the research being conducted by the specific higher educational institution, as well as the rights and duties of the introduction and economic efficiency services should be clearly specified in it.

Since more than 90 percent of the research conducted by higher educational institutions is performed in accordance with economic contracts, we are striving to see to it that the procedure of the use of the proposed development at the works would be specified already at the stage of the drawing up and conclusion of the contract. The system, which was introduced starting in 1983, of continuous sliding plans, which envisage all the stages of the "research--development--introduction" cycle, is designed for this purpose.

Especially good contacts, which are conducive to the rapid development and introduction of new equipment, emerge in case of the organization of

cooperation between higher educational institutions and sectors on the basis of joint orders and by the organization of sectorial scientific research laboratories. The orders, which envisage the performance of a cycle of jobs, which are important for the corresponding sectors, and the introduction of their results, have been signed by us jointly with a number of ministries and departments. Owing to this constant contacts between scientists and production workers are also established after the completion and acceptance of the jobs. Those of them, which are included in the plans of research, as a rule, are included by the sector in the plan of the development and introduction of new equipment. For example, the Ivano-Frankovsk Institute of Petroleum and Gas within the framework of one of these orders introduced about 20 development, including a number of new technological processes and technical means of the exposure of producing horizons and their development, which are protected by a number of certificates of authorship. The Kiev Technological Institute of the Food Industry within the framework of a joint order with the republic Ministry of the Food Industry developed and introduced at two plants equipment for obtaining malt of improved quality, which is used in the spirits industry. The Sumy Affiliate of Kharkov Polytechnical Institute on the basis of a joint order with the Ministry of Mineral Fertilizer Production and the Ukrainian Ministry of the Chemical Industry developed and introduced vibrating granulators and filters of fusion cake, which ensure the output of ammonium nitrate of increased quality.

The conducting at higher educational institutions of large-scale and long-term research within a single direction is conducive to the establishment of sectorial scientific research laboratories. They are established by special orders of the republic Ministry of Higher and Secondary Specialized Education and the sectorial ministries. Economic contracts, which are fulfilled for enterprises of the sector which purposefully orients the activity of the sectorial scientific research laboratories and includes the results of their work in its own plans on new equipment, are the basis of the activity of the sectorial scientific research laboratories.

Thus, at the Dnepropetrovsk Metallurgical Institute new economical shapes of rolled products of mass use were developed and introduced extensively in production, and the technology of their production was also changed, which made it possible to increase the quality of items, which are produced at enterprises of the automotive and aircraft industry, to ensure a saving of expensive alloys, to decrease the labor intensiveness of operations and to improve working conditions. The technology of the rolling of a number of special shapes, the use of which decreases the consumption of metal and reduces by several times the labor expenditures on the production of items, was developed and introduced at the sectorial scientific research laboratory of the Dneprodzerzhinsk Industrial Institute. The new technological process of the production of rollers of belt conveyors, which was proposed by the Kramatorsk Industrial Institute, makes it possible to decrease the labor intensiveness of the production of rollers, to reduce the consumption of metal, to boost labor productivity and to increase the durability of the idlers.

At the same time it should be noted that for higher educational institutions the question of the introduction of completed developments is especially

urgent, since they are used usually by other departments, in which the economic interest is still inadequate. Therefore, it is necessary to specify a unified procedure and date of the transfer of suggestions on completed developments for their introduction in production, inclusion in the corresponding plans on new equipment or further development and use by other organizations.

The higher educational institutions of the Ukraine are striving to use as much as possible various forms of the contact of science with production: contracts on scientific and technical cooperation (DNTS's), educational scientific production associations (UNPO's), contracts for the transfer of scientific and technical achievements (DNTD's), joint laboratories and affiliates of the characteristic chairs at the works.

The fulfillment at modern educational scientific production associations of work in conformity with comprehensive goal programs, which are aimed at the retooling of production and its supply with personnel with specialized training, has become a characteristic feature of them. At educational scientific production associations with the participation of higher educational institutions, which are subordinate to the republic Ministry of Higher and Secondary Specialized Education, research in the amount of tens of millions of rubles is performed annually, the results of completed developments are introduced with a significant economic impact. Within the associations thousands of concrete course and graduation projects are fulfilled by students.

Thus, Odessa Polytechnical Institute performed for the Kislorodmash Scientific Production Association work for the purpose of making better the design of nozzles for the improvement of the cutting of metal, which significantly increased labor productivity; jointly with the Tochmash Production Association it set up the production of high-precision automated scales for the weighing of objects in motion, while at the Pressmash Production Association a method of brigade forms of the organization of labor, which was developed at the institute, was introduced.

Portable flaw detectors like the Zond, which make it possible to ensure the quality of nondestructive testing at the level of the highest world standards, were developed within the Bureniye Educational Scientific Production Association with the participation of the Ivano-Frankovsk Institute of Petroleum and Gas.

An educational scientific center (UNTs) for the training of specialists and the conducting of research for diesel locomotive building is operating successfully at the Voroshilovgrad Machine Building Institute. An affiliate of the characteristic chair of the institute and a sectorial scientific research laboratory have been set up within the educational scientific center on the grounds of the Voroshilovgradteplovoz Production Association. Among its achievements it is possible to note the running-in greases for the traction reduction gears of diesel locomotives, which showed great efficiency under lengthy tests.

Higher educational institutions are devoting considerable attention to the copying of the results of scientific research and experimental design work in accordance with contracts for the transfer of scientific and technical achievements, which is providing a significant economic impact. In accordance with results of the analysis of the state of this activity the Ministry of Higher and Secondary Specialized Education drew up and sent to the management of subordinate higher educational institutions instructional procedural materials.

Within the framework of contracts for the transfer of scientific and technical achievements the Lvov Forestry Institute introduced a set of equipment for the sanding of lumber to final size, which made it possible to increase labor productivity sharply, and a technological regulation of the production of wood chips from the waste products of logging and small-size lumber. Let us cite another example. The Odessa Technological Institute of the Food Industry in accordance with a contract for the transfer of scientific and technical achievements developed a specialized means of transportation, which does not have domestic analogues.

It should be noted that the further broadening of cooperation on the basis of contracts for the transfer of scientific and technical achievements in a number of cases is being checked by the reluctance of production workers to introduce the transferred developments in good time and to transfer to higher educational institutions the bonuses due. It seems that in this connection documents, which explain a number of questions connected with the conclusion, fulfillment and completion of contracts for the transfer of scientific and technical achievements and the stimulation of developers, should be prepared.

In our opinion, contracts for the transfer of scientific and technical achievements are most effective in case of the need for the rapid introduction of developments which do not require series copying. In the instances when the series production of new equipment is required, we direct the attention of higher educational institutions to such planning of the stages of the fulfillment of the work, in case of which it would conclude with the production of a prototype (test run), its testing and acceptance, the modification of the technical specifications and the placement of the item in production.

The contact of higher educational institutions with production on the basis of contracts on scientific and technical cooperation has been expanded. Such contracts include a list of the obligations of the cooperating parties in the fulfillment and introduction of joint works and make it possible at a specific stage to identify the basic directions of the development of enterprises, the need for new developments, as well as the amounts and means of their implementation. At present comprehensive contracts on scientific and technical cooperation, which envisage a cycle of operations which are performed by the collectives of all the participating organizations, are undergoing development.

At Vinnitsa Polytechnical Institute in conformity with contracts on scientific and technical cooperation recommendations on situational methods of the planning and management of the operation of motor transport have been

fulfilled, a method of calculating the optimum technological process of the production of pipe has been developed. Lvov Polytechnical Institute in accordance with a contract on scientific and technical cooperation with the Kineskop Production Association developed a set of programs of the analysis of electronic circuits and a library of models of components, a technology of the regeneration and a method of checking the quality of regenerated phosphors, while for the LAZ Production Association it developed the optimum technological processes and conditions of the drying of painted items. The Kramatorsk Industrial Institute by way of the fulfillment of the contract on scientific and technical cooperation with the Melitopol Plant of Tractor Units developed a technological process of rolling out the blanks of the bodies of the pneumatic hydraulic accumulators of beat thinners.

In recent years such a form of the cooperation of higher educational institutions with production as the organization of joint work at scientific research laboratories and affiliates of chairs, which are set up on the grounds of enterprises and organizations, has been developed. The setting up of these subdivisions, undoubtedly, is contributing to the fact that science of higher educational institutions and the educational process are being brought closer and closer to the demands and problems of industry. The themes of research are being enriched, mixed creative collectives of scientists, students and production workers are being formed for the joint performance of research and the introduction of its results.

In order to acquaint the scientific and technical community with the scientific achievements of higher educational institutions and to solve the problem of their extensive introduction, the republic Ministry of Higher and Secondary Specialized Education has organized an exhibition under the motto "The Scientific Potential of Higher Educational Institutions for the 11th Five-Year Plan." In accordance with the results of the exhibition suggestions on the intersectorial use of a number of major works have been sent to interested organizations; many of the exhibited developments have already been included in the plans of the introduction of new equipment of enterprises.

Among the developments displayed at the exhibition are a technology of the treatment of sewage with immobilized microorganisms, which makes it possible to treat discharges with an increased concentration of organic impurities, to save expensive neutralizing agents, to reduce the size and to decrease the specific consumption of materials of treatment plants (the Makeyevka Construction Engineering Institute); a technology of the completion of wells on the basis of the control of the state of the formation zone near the bore hole, which makes it possible to increase the influx of petroleum (the Ivano-Frankovsk Institute of Petroleum and Gas); highly productive technological processes of obtaining hollow items from tubes by the method of rolling (the Kramatorsk Industrial Institute); highly productive fodder crops for animal husbandry (the Odessa Hydrometeorological Institute); mobile combined fruit and vegetable storehouses, which decrease sharply the losses of agricultural products during harvesting (the Odessa Technological Institute of the Refrigeration Industry); a multipurpose high-speed harrow, which saves metal and tills the soil more efficiently (Vinnitsa Polytechnical Institute); a technology of the laser hardening of parts and a new organosilicon water-repelling coating for the treatment of wall materials made from brick which is

not cold-resistant (Kiev Polytechnical Institute); types of asphalt concrete for road surfaces, which serve under the conditions of the corrosive media of livestock complexes (the Kharkov Institute of Automobile Roads); a technology and the equipment for the presowing irradiation of seeds of various crops, which increase their yield (Donetsk University), and many other developments.

Practical experience shows that the effectiveness of thematic exhibitions would increase significantly, if the recommendations of the seminars, which are held on their basis, were accepted without delay by the corresponding ministries for use.

For the further improvement of the notification of various sectors of industry about scientific and technical achievements for the purpose of their rapid use the republic Ministry of Higher and Secondary Specialized Education and the Ukrainian Scientific Research Institute of Scientific and Technical Information drafted, approved and introduced in practice a statute, which specifies the procedure of cooperation between higher educational institutions, the Ukrainian Scientific Research Institute of Scientific and Technical Information and its intersectorial territorial centers, on questions of the exchange of scientific and technical information on promising developments of higher educational institutions, which have been completed and introduced for the first time.

The analysis of the functioning of the system of the transmission of information shows that its efficiency can be increased on the condition of the more efficient drawing up, passage and dissemination of information bulletins, as well as the increase of the responsibility of enterprises--the recipients and users of this information--for the introduction of borrowed scientific and technical achievements and the reflection of the technical and economic indicators, which have been achieved here, in statistical reporting.

We have outlined a set of additional measures on the implementation of the decree of the CPSU Central Committee and the USSR Council of Ministers on the assurance of the acceleration of scientific and technical progress in the national economy. The implementation of these measures will make it possible to increase the efficiency of research of higher educational institutions. At the same time the solution of the problems, which are checking at higher educational institutions the work on the planning, fulfillment, acceptance, introduction and technical and economic analysis of completed scientific research operations, should be expedited.

In particular, it is necessary to differentiate more clearly the rights, duties and responsibility of the performers and clients for the introduction of completed developments. There are also many vagaries in the questions of the payment of bonuses to associates of higher educational institutions from the funds of higher educational institutions and enterprises for the development and introduction of new equipment.

So far a unified procedure of the accounting of the economic impact from the introduction of completed developments, as well as of the accounting of the proportionate participation of the organizations which are coperformers has not been established. Difficulties in case of the obtaining of the national

economic impact arise at times with the clients. In this connection the approval and introduction in practice of the procedural instructions "The Organization of the Work at Technical and Technological Higher Educational Institutions on Questions of the Introduction, Technical and Economic Analysis and Evaluation of Applied Scientific Research Work," which were formulated by the Main Administration of Scientific Research Work of the USSR Ministry of Higher and Secondary Specialized Education, should be expedited.

We are experiencing great difficulties in the development of the pilot experimental base. Since limits and assets are not allocated centrally for these purposes, mainly only the interested ministries allocate them. In spite of the fact that the statute on the socialist enterprise was extended by a decree of the USSR Council of Ministers (1980) to the cost accounting enterprises of the system of the USSR Ministry of Higher and Secondary Specialized Education, there is another difficulty: cost accounting enterprises transfer the derived profit entirely to the budget and do not have the right to spend it for the development of their base. We have repeatedly requested that cost accounting enterprises be permitted to use the profit for the development and modernization of their own base, but so far this question has not found positive settlement.

At present in the republic Ministry of Higher and Secondary Specialized Education and higher educational institutions steps are being taken for the further tightening up of the monitoring and the increase of personal responsibility at the level of the ministry, higher educational institutions, faculties, scientific subdivisions and managers of operations for the assurance of a high degree of their completion, as well as for the fulfillment of the plans of the introduction of completed scientific research and experimental design operations. In particular, we are selecting the most important promising developments and are assigning those personally responsible for their introduction at the level of the ministries and the rector's offices of higher educational institutions. The practice of the constant economic analysis of the efficiency of scientific research and experimental design work at all levels, as well as the causes of the refusals of sectors to introduce promising highly efficient technologies and items is becoming more and more widespread. The extensive notification of the scientific and technical community, interested ministries, departments, enterprises and organizations about promising scientific and technical developments of higher educational institutions through the organs of scientific and technical information, as well as by the organization of exhibitions and radio speeches is being organized.

The higher educational institutions of the Ukraine are exerting all efforts for the further increase of the quality of the training of specialists, the improvement of the use of the scientific and technical potential and the increase of the contribution of scientists of higher educational institutions to the acceleration of scientific and technical progress and the increase of labor productivity on the basis of the most rapid and large-scale introduction of scientific and technical developments in production.

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GENERAL

ECONOMIC STIMULI TO INCREASE PRODUCTION LEVEL, PRODUCT QUALITY

Tashkent EKONOMIKA I ZHIZN' in Russian No 1, Jan 85 pp 39-43

[Article by Doctor of Economic Sciences Professor N. Belyy: "Economic Stimuli of the Increase of the Technical Level of Production and the Improvement of Product Quality (A Discussion on the Third Theme of an Educational Course)"; passages rendered in all capital letters printed in boldface in source]

[Text] There are two basic levers of the intensification of our economy: the acceleration of scientific and technical progress and the improvement of our entire economic mechanism. So it was specified in the decisions of the 26th CPSU Congress and has been repeatedly stressed in the decrees of subsequent plenums of its Central Committee. The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" directs attention to the efficient use of the achievements of science and technology in production, especially under the conditions of the large-scale economic experiment. The basic directions of the introduction of the latest scientific and technical developments, advanced technologies and advanced know-how for the purpose of ensuring the output of products, which conform in their indicators to the best domestic and foreign models, are indicated in this document. A number of current demands on the system of the planning and management of scientific and technical progress are also formulated in the decree.

Until recently in many sectors of industry several aspects of scientific and technical progress did not find adequate reflection in the plans. For example, in the five-year plan the list of assignments on the assimilation of the production of new types of products and advanced technological processes, which are of particularly great importance for the development of the sector, acted as the only approved indicator on the introduction of new equipment. Centralized planning also did not encompass such end results as the economic impact from introduction and the indicators of the technical level of production and the most important types of output being produced. The plan of scientific and technical, experimental design and technological operations was drawn up, as a rule, for a year, and therefore the long-range trends of the development of science and technology were not taken into account.

What is the procedure of compiling the plans of scientific and technical development for industry as a whole and for the associations and enterprises operating under the conditions of the economic experiment, in particular? In this regard there is the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979, "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality." It is indicated in it that the elaboration and introduction in production of the achievements of science and technology, as well as the implementation of organizational measures, which are connected with this, are envisaged without fail by a special section of the five-year plans of the economic and social development of sectors, associations and enterprises. These plans are coordinated with the directive indicators--the increase of labor productivity, the increase of the share of products of the highest quality category or another appropriate indicator which has been established for the given sector. The basic assignments on the fulfillment of scientific and technical programs include the introduction of new equipment, the assimilation of efficient technological processes and the production of high quality types of products.

In the annual plans of economic and social development the assignments on these indicators are specified even more thoroughly. Consequently, the set of approved plan indicators of scientific and technical progress, first, is being enlarged significantly and, second, a number of new indicators, which characterize the qualitative features of the management of the development of science and technology, are being included in it. Third, the sphere of application of goal program methods of planning is being enlarged. Here the necessary linking of the programs with the corresponding sections of the plan and with material and financial resources is being ensured.

TECHNICAL AND ECONOMIC PLANNING at production associations (enterprises) is a component of the planning of scientific and technical progress. Its basic task is to envisage the technical, economic and organizational measures, which are necessary for the fulfillment of the outlined assignments on the production and sale of products with the most efficient use of the available resources.

The introduction of new equipment and modern technology is assuming particular importance under the conditions of the economic experiment, in which this indicator acts as one of the main ones when evaluating economic activity. The experiment is creating additional opportunities for the retooling of production and the updating of products.

The collective of the Tashelektromash Plant with the first steps of work under the conditions of the economic experiment successfully began the implementation of the program of the retooling of enterprises, which envisages the solution of such important problems as the improvement of the processes of the impregnation, painting and electroplating of items. Multi-electrode units for the spot welding of the casings of transformers have been introduced, which has made it possible in this section to decrease the amount of labor-consuming operations and to increase labor productivity by twofold. Moreover, a mechanized storehouse for the storage of parts has been fitted out in Shop No 3. As a result difficult physical labor has decreased sharply, the

standards of production have risen and the available working time has increased. It is not surprising that the exceeding of the plan assignments on the basic indicators is becoming the norm here.

The measures being planned on new equipment should be formulated very clearly, their economic efficiency should be indicated without fail and should be closely linked with the prevailing system of norms and standards, which the collective of the Tashelektromash Plant also did when preparing the program of the retooling of the enterprise.

Under the conditions of the experiment the role of the stimulation of scientific and technical progress is increasing. A fundamental component of it is economic stimulation, of which the pricing of new equipment, the standards of the evaluation of the activity of scientific and technical organizations and cost accounting are the basic levers. Let us briefly examine each of these factors.

The pricing of new equipment envisages the establishment of two special types of prices--limit prices, which take into account the efficiency of innovations, and graduated prices, which take into consideration the phase of their life cycle. Here the prices are differentiated with allowance made for the scarcity of some types of new equipment or others. The limit prices are established on the basis of the socially necessary expenditures with allowance made for the quality of the equipment and the amount of the impact which it yields in the sphere of use.

Graduated prices reflect the stages of the life cycle. At the first stage they are increased for the standard period of the assimilation of the output of the equipment, so as to offset in part the expenditures on assimilation and to make the use of items, which for the present are still scarce, efficient in only the most profitable spheres. At the second stage, when the national economic efficiency reaches a maximum, the price per unit of impact is decreased substantially for the provision of a cost accounting basis. At the third stage the cost of items decreases not longer owing to their series production, but as a result of obsolescence.

The standards of evaluation are assignments, which are established centrally for a long period for a group of enterprises which are comparable in the conditions of economic activity, on the level of efficiency of production, on the basis of which the results of their work and the results of competition are evaluated and the material incentive funds are formed. They are called upon to provide equal conditions of stimulation for collectives which manage under objectively unequal production conditions and to distinguish the factors, which do not depend on the enterprise, from independent, external factors. Their stimulating role consists in the fact that they link the financial resources, which the sector or organization has for a number of years in the future, with the results of its work. Here the ministry in any case should make the planned amount of payments from the profit to the budget. This creates material responsibility for the observance of the standards of the use of resources and an interest in exceeding them.

Under the conditions of the experiment special indicators of the comprehensive evaluation of the activity of enterprises in the area of scientific and technical progress are being singled out. In its sphere cost accounting is a set of economic relations of society (in the person of state and sectorial organs of management), production associations (enterprises), scientific and technical organizations and their collectives, which is based on the economic independence of the indicated organizations. Here full cost accounting is possible only for scientific production complexes, within which the formation of the expenditures on scientific and technical programs and the achievement of the ultimate impact are accomplished.

The state bears a significant portion of the expenses for the improvement of equipment and production technology. By means of its budget scientific research institutes, planning and design organizations, organs of scientific and technical information and higher and secondary specialized educational institutions are supported and especially important scientific research work, which requires significant expenditures, is financed. In turn, each scientific production and production association and enterprise bear the expenses on the improvement of new types of products, the increase of the quality of items and so on. In part these expenditures are included in the product cost and in part are covered from special funds.

At present in the ministries and departments there is a UNIFIED FUND FOR THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY (YeFRNT), the assets of which are used for the financing of a number of measures on the technical development of production. By means of the assets of the unified fund for the development of science and technology one-time bonuses for scientific and experimental design development are paid, the assimilation and mass production of especially important and highly efficient types of equipment and machines, as well as the development and assimilation of new technological processes are carried out. Measures on technical progress can be financed from the production development fund. State Bank loans, which were obtained by enterprises for the introduction of new equipment, are repaid by means of this fund.

The expenditures on retooling are made by means of the assets of the production development fund, which are envisaged within the state capital investments, and are singled out in the plan SEPARATELY as noncentralized capital investments, as well as along with centralized capital investments.

**THE ASSETS OF THE PRODUCTION DEVELOPMENT FUND, WHICH HAVE BEEN ACCUMULATED BY ENTERPRISES, ARE NOT LIABLE TO CONFISCATION.**

The allocation of equipment and other resources for carrying out retooling, which are financed by means of the assets of the production development fund, is carried out in the same manner as for state centralized capital investments.

The banks grant long-term credits for these measures. Their repayment is made from the assets of the production development fund and, if there are not enough of these assets, from the above-plan profit which is left at the disposal of enterprises.

In case of economic expediency enterprises can use for additional expenditures on retooling a portion of the amortization deductions, which are intended for capital repair, in excess of the limits, which are envisaged by the plan, of state centralized capital investments.

The assurance of a high product quality and its systematic improvement are mandatory requirements of the development of the economy and the increase of the efficiency of social production. The question is becoming especially urgent under the new conditions of management. As is known, among the basic indicators, which are approved under the conditions of the economic experiment, the fulfillment of the plans on the production of new highly efficient products and items of the highest quality category is the most important one. For each percent of the exceeding of this indicator the labor collective receives additional deductions for the material incentive funds.

Success in the drive for the improvement of product quality is governed in many ways by the system of the stimulation of all participants, starting with the stage of the development of new models of items and ending with commercial production.

The piece-rate wage with increments and bonuses for the high quality of the products made by the worker, as well as the time-rate plus bonus wage and deductions for rejects are mainly used as material stimuli. Collective stimulation is carried out by the payment of bonuses to managers, engineering and technical personnel and employees for the improvement of product quality. Grade-based wholesale prices for products, claims, the fines collected from enterprises for the delivery of poor quality items and so on are also grouped with the forms of collective stimulation.

The enterprises, which develop, assimilate the production and deliver items of general equipment, are given the right to pay special-purpose bonuses to the workers of the corresponding production associations FOR THE DELIVERY OF PRODUCTS ON TIME, with the expenditure for this purpose of assets in the amount of UP TO 1 PERCENT OF THEIR VALUE. The payment of the bonuses should be made within the limits of the wage fund, which has been calculated in accordance with the established standards, without the exceeding of the maximum amounts of the bonuses.

If the enterprise fulfills the plan assignments on the output of products, WHICH CORRESPOND TO THE BEST WORLD AND DOMESTIC MODELS, AND THE ANNUAL PLAN ON THE SALE OF PRODUCTS (WITH ALLOWANCE MADE FOR CONTRACTUAL OBLIGATIONS), one-time bonuses are paid to the managerial personnel of the enterprise (association) by means of the material incentive fund in the amount of UP TO THREE SALARIES IN EXCESS OF THE ESTABLISHED MAXIMUM AMOUNTS OF BONUS PAYMENTS.

For the enlargement of range (assortment) and the increase of the output of machines, equipment and instruments for export the engineering and technical personnel and other specialists will receive special bonuses in excess of the established maximum amounts.

THE MATERIAL STIMULATION OF THE PARTNERS of the enterprises participating in the experiment is also envisaged: THEY ARE PAID BONUSES FOR THE EARLY AND

## HIGH QUALITY PERFORMANCE OF CONTRACTUAL OPERATIONS WHICH ARE CONNECTED WITH THE DEVELOPMENT, ASSIMILATION AND INTRODUCTION OF NEW EQUIPMENT.

Enterprises and associations are also granted other rights, which stimulate the material interest in the quality of the output being produced and its improvement. In consultation with the client (buyer) they can establish independently the wholesale prices for semifinished products, assemblies and parts of intraministerial use, as well as for test batches (prototypes) of items for production engineering purposes and general equipment, if approved prices for them are lacking.

Changes are made in the existing prices in accordance with the same principle, if at the request of the client in the complete set of products refinements, which improve their quality and increase the service line, occur.

The enterprises participating in the experiment can INCREASE THE PRICES FOR NEW PRODUCTS BY UP TO 30 PERCENT independently, WITHOUT THE CONSENT of superior organs, if they correspond to the best world and domestic models.

The bonus systems are also an important unit in the improvement of the organization of wages and in the increase of their stimulating influence on workers. In proper combination with the basic forms of the remuneration of labor (piece-rate and time-rate), the rate conditions and the staff salary system they make it possible to differentiate more accurately and better the amount of the wage subject to the quality of the labor of workers and to link their material interests more closely with the solution of the problems of increasing product quality.

The quantitative and qualitative indicators of the payment of bonuses should be combined more extensively. Depending on the specific tasks, the specific nature of production, as well as the category of those being paid bonuses, such indicators of quality as the increase of the proportion of products, which are turned over on first appearance, the decrease of losses from defective output, the increase of the volumes of output of products with the Emblem of Quality, the improvement of the grade, durability, point rating of products and so on can be included in this combination.

It is natural that the use of a broad group of indicators of the payment of bonuses creates the need for the distinction of the basic and additional indicators. Here the payment of bonuses for the increase of the quality of the output being produced should be made, as a rule, in accordance with the quantitative indicators of work on the condition of the observance of the established indicators of the quality of the produced output (performed work).

The skillful use of economic stimuli of the increase of product quality at the Andizhan Elektroapparat Plant, for example, enabled the enterprise to exceed the plan of the output of items with the State Emblem of Quality and to increase their share to 36 percent.

The collective of the Sredazkabel' Production Association during the period of the conducting of the economic experiment began to devote particular attention to the increase of the quality of the output being produced. The monitoring

on the part of the technical control division was made more exacting: each time certificates for condemned products are drawn up, the corresponding amounts are collected from the specific parties to blame for the defective output, other economic measures are also used. And here are the results: the quality of copper wire, magnet wires, long-range communications cables and flexible trailing and excavator cables has already improved.

At the same time all this for the present is not yielding the desired results, in particular, the percentage of the turning over of items on first appearance, including cables for petroleum pumps and power cables in plastic and in paper insulation, has decreased. Here one of the reasons, in our opinion, is the fact that for the present at the association an adequate link does not exist between the used economic stimuli of quality and the implementation of measures which are aimed at the increase of the technical level of production.

An important means of improving the quality of a product is the STANDARD, which regulates its technical level, reliability, durability and economic, esthetic and ergonomic characteristics. The improvement of the economic mechanism involves the solution of the problem of changing over to a set of leading standards. They should be developed at the same time as scientific research and experimental design developments of new products. This will help enterprises to produce items which satisfy the requirements of not only today, but also tomorrow.

The comprehensive nature of the influence of scientific and technical progress on product quality required the formulation of programs of comprehensive standardization. They apply to the most important types of industrial products and reflect the demands on materials, components and the finished product. At present 150 such programs have been formulated, of them 69 are aimed at the increase of the efficiency of the use of fuel and energy resources, the development of new consumer goods and the standard technical support of the assignments of the USSR Food Program.

A new stage in the increase of the role of standards in the improvement of product quality was specified by the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy." The development and introduction of standards with indicators, which correspond to the leading level of achievements of world science and technology, were made the cornerstone. The changeover to a fundamentally new type of standards with long-range demands for the group of similar products will be realized in full in 1985.

PRODUCT CERTIFICATION is an effective means of increasing the technical level and quality of items. The need for its further improvement is indicated in the same decree. However, so far radical changes have not occurred on this level. Not all the parameters of individual items yet satisfy present requirements. Inadequately developed models: without careful preliminary tests and the proper technological preparation, quite often appear on the conveyor. At times the quality of items decreases in the process of production. That is why a fundamentally new approach to the use of the

advantages of product certification was needed. As of 1 July 1984 a new procedure of the certification of industrial products according to two quality categories was approved and introduced. Its main distinction: a strict criterion of evaluation--a product of the highest quality category should correspond in technical and economic indicators to the best domestic and foreign models.

The preliminary results of the economic experiment make it possible to draw the conclusion that the set of measures, which are aimed at the improvement of the economic stimuli of the increase of the technical level of production and the improvement of product quality, is having as a whole a positive influence on the economic activity of production associations (enterprises) of the corresponding sectors of industry. And although these results for the present are still very modest, they confirm with all obviousness that the correct policy of the improvement of the economic mechanism has been adopted. And the advisability of extending the experiment to other sectors of industry is obvious.

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GENERAL

EFFECTIVENESS OF EXPENDITURES ON INTRODUCING NEW EQUIPMENT

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 2, Feb 85 pp 95-96

[Article by Candidate of Economic Sciences S. Trilevich: "Increase the Effectiveness of the Expenditures on the Introduction of New Equipment"]

[Text] Scientific and technical progress, as is known, serves as the main source of the increase of the efficiency of social production. Attaching great importance to the increase of the effectiveness of the expenditures on the introduction of new equipment, the Collegium of the Ukrainian SSR State Planning Committee in September 1984 examined the question of the state of this work in republic ministries and departments and of measures on the assurance of the fulfillment of the corresponding assignments of the 11th Five-Year Plan.

In the collegium it was noted that during 1981-1983 for Ukrainian SSR ministries and departments as a whole the assignments of the state plan of the development of science and technology with respect to the indicators of the economic impact were exceeded, including on the decrease of the cost of commodity production--by 23.8 percent and on the relative decrease of the number of workers--by 2.5 percent. As a whole the plan assignments were also fulfilled during the first half of 1984. The number of enterprises, which are actively introducing new equipment and are fulfilling the plan assignments on the increase of the technical level of production, increased. The number of enterprises, which are not covered by technical measures, in the Ukrainian SSR Ministry of Ferrous Metallurgy, the Ukrainian SSR Ministry of the Construction Materials Industry and the Ukrainian SSR Ministry of Construction of Heavy Industry Enterprises decreased.

The number of introduced technical measures at industrial enterprises of the republic in 3 years of the current five-year plan as compared with the corresponding period of the 10th Five-Year Plan increased by 25.5 percent, while the economic impact from their introduction increased by 27.3 percent. The introduction of advanced technologies and the mechanization of production processes account for the bulk of the obtained impact.

At the same time the shortcomings in the work of ministries and departments on the increase of the effectiveness of the expenditures on the introduction of

new equipment were also noted in the Collegium of the Ukrainian SSR State Planning Committee. Thus, the return on expenditures per technical measure decreased somewhat, the expenditures per conditionally freed worker increased. This is especially characteristic of the industrial enterprises of the Ukrainian SSR Ministry of Industrial Construction, the Ukrainian SSR Ministry of Installation and Special Construction Work and the Ukrainian SSR Ministry of Consumer Services. Not all ministries and departments are ensuring the fulfillment of the plan assignments with respect to the indicators of the economic impact from the implementation of scientific and technical measures. The fulfillment of the assignments of the five-year plan on the decrease of the product cost by means of the introduction of new equipment is under the threat of being upset in the Ukrainian SSR Ministry of the Fruit and Vegetable Industry, the Ukrainian SSR Ministry of Agriculture, the Ukrainian SSR Ministry of Procurement, the Ukrainian SSR Ministry of Rural Construction, the Ukrainian SSR Main Administration of the Horticulture, Viticulture and Winemaking Industry and the Ukrainian SSR State Committee for Publishing Houses, Printing Plants and the Book Trade, while on the relative decrease of the number of workers--in the Ukrainian SSR Main Administration of the Petroleum Refining and Petrochemical Industry, the Ukrainian SSR Ministry of the Fruit and Vegetable Industry, the Ukrainian SSR Ministry of the Meat and Dairy Industry, the Ukrainian SSR Ministry of Rural Construction and the Ukrainian SSR Ministry of Consumer Services.

The inadequate scale of the introduction of measures in the main and most effective directions of scientific and technical progress was also noted at the meeting of the Collegium of the Ukrainian SSR State Planning Committee. Thus, in 1983 about a third of the industrial enterprises of the republic did not perform work on the introduction of advanced technologies, more than 80 percent--on the automation of production and 73.5 percent--on the modernization of operating equipment. The scale of the introduction of the results of completed scientific research is still inadequate and the time of their introduction is still great. The ministries and departments of the republic are inadequately monitoring, analyzing and directing the work on the increase of the influence of technical measures on the basic indicators of the activity of subordinate enterprises, including on labor productivity and the product cost. As a result of this at 13 percent of the enterprises the introduction of new equipment did not have an influence on the increase of labor productivity. Proper attention is also not being devoted to the uniform distribution of the plan assignments and to the increase of the quality and degree of reliability of primary reporting, the data cited in it are not being subjected to evaluation. The procedural work on questions of the planning and analysis of the indicators of the economic effectiveness of the introduction of scientific and technical achievements also requires further improvement.

A decision, which envisages the implementation of practical measures on the elimination of the noted shortcomings and the further improvement of

analytical planning and procedural work on the increase of the effectiveness of the expenditures on the introduction of new equipment, was adopted at the meeting of the collegium.

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GENERAL

SOCIALIST COMPETITION IN SCIENCE, TECHNOLOGY

Moscow EKONOMICHESKAYA GAZETA in Russian No 10, Mar 85 p 15

[Review of book "Sotsialisticheskoye sorevnovaniye v sfere nauchno-tekhnicheskoy deyatel'nosti" [Socialist Competition in the Sphere of Scientific and Technical Activity], edited by Doctor of Philosophical Sciences R. G. Yanovskiy, Vysshaya shkola, Moscow, 1984, 416 pages: "Competition and Scientific and Technical Progress"]

[Text] Throughout the history of socialist competition in our country scientists and engineering and technical personnel have taken an active part in it in creative cooperation with workers. A vivid example of this is the Stakhanovite movement, which was competition for high labor productivity, the better use of new equipment and the continuous improvement of production. Today new demands, which follow from the tasks of the intensification of the economy and the acceleration of scientific and technical progress, are being made on the organization of competition in the sphere of science and technology.

These urgent questions are examined in the collective monograph "Sotsialisticheskoye sorevnovaniye v sfere nauchno-tekhnicheskoy deyatel'nosti" [Socialist Competition in the Sphere of Scientific and Technical Activity] (Moscow, Vysshaya shkola, 1984, 416 pages), which was published under the general editorship of Doctor of Philosophical Sciences R. G. Yanovskiy. Its authors--prominent scientists, party, trade union and economic executives--are organizers of and participants in the competition in the sphere of science and technology. The book is devoted to the 50th anniversary of the Stakhanovite movement.

The Soviet Union has a mighty scientific and technical potential. In all 4.5 million people, including 1.4 million scientists and science teachers, are employed in the sphere of science and scientific service. An enormous complex of scientific research, design and planning and technological organizations, scientific subdivisions at higher educational institutions, as well as pilot works has been established. Scientific production associations are being developed.

Under these conditions the organization of comprehensive competition in the sphere of scientific and technical activity and the strengthening of its

influence on the increase of the yield of the creative potential of scientists, engineers, technicians and worker-innovators are assuming particular importance. These problems are reflected in detail in the monograph.

The experience of the leading collectives of Moscow, Leningrad, Kiev, Novosibirsk and other cities of the country, which have achieved high results in the socialist competition, is generalized in the book. Various forms of competition: for the acceleration of scientific and technical progress in the sector and in the region, for the successful fulfillment of scientific and technical programs, are analyzed in the individual chapters.

In the work the closest attention is devoted to these important questions. The experience of the party supervision of socialist competition, of the work of trade union and economic organs on its organization at scientific research institutes, design bureaus, enterprises and associations and of the participation of the scientific and technical community in this is analyzed in detail in the pages of the book. Procedural materials on the organization of competition are cited in the appendix.

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GENERAL

GAINS IN MEDICINE REPORTED TO MEDICAL ACADEMY PRESIDIUM

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 1, Jan 85  
pp 91-95

[Article by Ye. K. Ponomar' (Moscow): "In the Presidium of the USSR Academy of Medical Sciences"]

[Text] The Presidium of the USSR Academy of Medical Sciences heard the report of Member of the Presidium of the USSR Academy of Medical Sciences Academician V. I. Votyakov "On the State and the Prospects of the Development of Medical Science in the Belorussian SSR."

The Presidium of the USSR Academy of Medical Sciences noted that the Belorussian SSR has highly skilled staffs of scientists, who are working in the area of biological and medical problems, as well as in the area of the development of medical equipment and new medicinal preparations.

Two institutes of the Belorussian SSR Ministry of Health are the head ones for problems of union significance (the Belorussian Institute of Epidemiology and Microbiology--for the problem "Chemotherapy and Chemoprophylaxis of Viral Infections" and the Belorussian Institute of Neurology, Neurosurgery and Physiotherapy--for the problem "Diseases of the Peripheral Nervous System").

During the years of the 10th Five-Year Plan the transition was made to the goal program planning of scientific research, which contributed to the broadening of the integration of the work of scientific institutions and to the establishment of closer relations with industrial enterprises and organizations of all the sectors of the national economy. A system of the planning of scientific research and the organization of the introduction of completed developments into health care practice was developed.

So far 30 basic departmental programs have been approved and 2 have been included among the most important scientific and technical problems which are to be realized in 1981-1985 (oncology, cardiology), moreover, the scientific institutions of the Belorussian SSR Ministry of Health are participating in the fulfillment of union programs and are performing combined research in creative cooperation with more than 100 scientific research institutes, higher educational institutions and industrial enterprises of not only Belorussia, but also other republics of the country.

Work is being performed on the concentration of forces and assets on the determination of the most important and promising directions. The centralized, special-purpose earmarking of allocations by means of the annual increase of state budgetary assets for the development of science, as well as the obtaining of additional allocations from the reserve of the USSR State Committee for Science and Technology are being used in practice.

In accordance with the results of basic and applied research during this years important outcomes were obtained and 958 developments were proposed for introduction at various levels (of them 209 were included in the plan of the Belorussian SSR Ministry of Health and 61 were included in the plan of the USSR Ministry of Health). In all, 267 certificates of authorship were received, 2,238 efficiency proposals and 1 application for a prospective discovery were made. Some 341 recommendations were issued and prepared for issuing, 116 monographs and 77 collections of scientific works were published. In all 98 doctors of sciences and 281 candidates of sciences were trained.

In conformity with the decisions of the 26th CPSU Congress, the decree of the CPSU Central Committee and the USSR Council of Ministers of 22 September 1977 "On Measures on the Further Improvement of Public Health," as well as on the basis of the decree of the General Assembly of the USSR Academy of Sciences and the General Assembly of the USSR Academy of Medical Sciences of 20 November 1980 "On the Further Development of Basic Research for Medicine" in 1980-1981 work was continued on the strengthening of the contact of the USSR Academy of Medical Sciences with the Collegium and Scientific Medical Council of the Belorussian SSR Ministry of Health, with the Presidium of the Belorussian SSR Academy of Sciences and institutes of the republic, which are carrying out developments on the problems which are being treated by the USSR Academy of Medical Sciences. A joint meeting of the Presidium of the USSR Academy of Medical Sciences, the Presidium of the Belorussian SSR Academy of Sciences and the Collegium of the Belorussian SSR Ministry of Health was held in Minsk.

In the program reports and statements at this meeting there was emphasized the need for the improvement of the methods of the prevention, diagnosis and treatment of the most prevalent diseases, including cardiovascular, endocrine and viral diseases, malignant tumors and others; the study of the mechanism of the development of neuroses, vascular and hereditary diseases; the elaboration of the problems of influenza, viral hepatitis, measles and diseases of the peripheral nervous system; the study of the problems of the reproductive function of women, the rearing of health progeny, the age physiology and pathology of a child; the elaboration of biomedical problems, questions of environmental protection and labor hygiene; research in the area of heart and vascular surgery, the improvement of the methods of the treatment of acute thromboses and embolisms of major vessels, acute myocardial infarction, traumatic injuries, the transplanting of organs and tissues, including the kidney and pancreas; the study of the genetic bases of immune deficient conditions, the mechanisms of immunological tolerance, auto-immunity; the ascertainment of the role of interferon in infection and immunity; the study of the medical consequences of the use of nuclear weapons, as well as the development of new medicinals, and first of all cardiovascular and psychotropic medicinals and antibiotics.

In the adopted joint decree of the presidiums of the USSR Academy of Medical Sciences and the Belorussian SSR Academy of Sciences and the Collegium of the Belorussian SSR Ministry of Health the specific achievements of medical science in the republic on the basis of the comprehensive integration of the institutes of the USSR Academy of Medical Sciences and the Belorussian SSR Academy of Sciences and the sectorial institutes of the Belorussian SSR Ministry of Health were reflected and the directions of research in 1981-1985 in conformity with the actually formed directions of scientific activity of the institutes of the Belorussian SSR, with the level of world achievements and the requirements of medical practice were specified.

For the purpose of realizing the outlined prospects in the development of medical science in the republic it was deemed expedient to set up a republic interdepartmental scientific council for the development of basic research for medicine and to entrust to it the formulation of a comprehensive program on the scientific problems in the area of medicine, among which there were recommended as priority ones research in the new directions in the area of the physiology of the brain, the structural-functional organization of the autonomic nervous system, the study of the mechanisms of the neurohumoral regulation of functions, the biology of aging processes, the methods of the treatment of oncological, cardiovascular and narcological diseases, interferon, lymphokyns, factors of the growth of nerves, macromolecular inhibitors and hemostasis, questions of the optimization of the motor activity of man, the biomedical aspects of environmental protection.

The Presidium of the USSR Academy of Medical Sciences approved of the basic assumptions of the report of Academician of the USSR Academy of Medical Sciences V. I. Votyakov and commissioned him jointly with scientists of the Medical Council of the Belorussian SSR Ministry of Health and the Presidium of the Belorussian SSR Academy of Sciences to constantly take the necessary steps on the implementation of the joint decree of the presidiums of the USSR Academy of Medical Sciences and the Belorussian SSR Academy of Sciences and the Collegium of the Belorussian SSR Ministry of Health "On the Further Development of Basic Research in the Belorussian SSR for Medicine" and the decree of the joint session of the general assemblies of the USSR Academy of Sciences and the USSR Academy of Medical Sciences of 20 November 1980.

The departments, scientific councils and Scientific Coordinating Division of the USSR Academy of Medical Sciences were commissioned to enlist the medical science institutions of the Belorussian SSR more extensively as performers of individual themes, special problems and directions of the state and departmental programs of the USSR Academy of Medical Sciences.

The Presidium of the USSR Academy of Medical Sciences heard and discussed the report of Corresponding Member of the USSR Academy of Medical Sciences V. P. Lozov, director of the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences, "On the State and Prospects of Research of the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences for the 11th Five-Year Plan."

The Presidium of the USSR Academy of Medical Sciences noted that the scientific activity of the institute is aimed at the fulfillment of the tasks, which were posed by the decisions of the 26th CPSU Central Committee in the area of medical science and health care and by the decree of the CPSU Central Committee and the USSR Council of Ministers of 13 August 1979 "On the Further Development of Medical Science in the Regions of Siberia and the Far East."

The institute is a performer of state programs on the problems of immunology and genetics, leucoses of man, agricultural animals and poultry. Research is being conducted in cooperation with institutes of the USSR Academy of Medical Sciences, the USSR Ministry of Health and the Siberian departments of the USSR Academy of Medical Sciences, the USSR Academy of Sciences and the All-Union Academy of Agricultural Sciences imeni V. I. Lenin.

The collective of the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences has obtained a number of important developments which are of basic and applied importance. The results of its research have been published in 3 monographs and 43 articles in the central press and 1 collection, it has received 1 certificate of authorship and has proposed 15 scientific developments for introduction.

The Commission for the Problem "Immunology" of the Scientific Council for Medical Problems of Siberia, the Far East and the Far North of the USSR Academy of Medical Sciences, for which the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences is the head institution, has begun working.

At the institute 16 scientific associates and physician-immunologists from cities of Siberia, the Far East and the Far North have undergone training at workplaces.

During the 11th Five-Year Plan the scientific research activity of the Institute of Clinical Immunology will be aimed at the further development of the study of the fundamental principles of the regulation of the functions of immunity under the conditions of the norm and pathology, the mechanisms of the recognition of "friend and foe" with the use of modern theories of immunity, immunogenetic research, the study of the functional and antigen markers of immunocomponent cells, intercellular interactions, as well as the reciprocal influence of the immune and neuroendocrine systems, which will make it possible to understand the mechanisms of the onset and development of diseases of the immune system. The study of the role of immune reactions in inflammation processes, in case of regeneration and sclerogenesis will be continued, as a result of which it will be possible to obtain new data on the timing of pathological processes.

Along with this the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences in its work is experiencing a number of difficulties and has shortcomings. In particular, it has not yet formed completely its scientific ties and contacts with the scientific institutions of the USSR Academy of Medical Sciences and the USSR Ministry of Health, as well as with the scientific councils of the USSR Academy of Medical Sciences. It has an inadequate material and technical base, in its structure

such important subdivisions as laboratories of immunochemistry, immunogenetics and immunomorphology are lacking; the problems of the supply of the institute with laboratory animals and the creation of the nursery for it are being solved slowly. The institute as the head institution of the Siberian Department of the USSR Academy of Medical Sciences for the problem "Immunology" has insufficiently developed its work on the planning and coordination of scientific research in the area of immunology at institutions of Siberia and the Far East. At the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences many scientific associates do not have an academic degree, but proper work is not being performed here on the preparation of a dissertation by them. The questions of the introduction of the results of the scientific research of the institute in health care practice also require more attention.

The Presidium of the USSR Academy of Medical Sciences approved of the scientific and scientific organizational work, which has been performed by the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences, and agreed with the suggestion of the Presidium of the Siberian Department of the USSR Academy of Medical Sciences to recommend to the institute to continue during the 11th Five-Year Plan the study of the mechanisms of the development of immunopathological processes and the development of new methods of the diagnosis, prevention and treatment of diseases, which are connected with the disturbance of the function of immunity among the population of the eastern part of the country, and the regulation of the functions of the immune system.

It was recommended to Corresponding Member of the USSR Academy of Medical Sciences V. P. Lozov, director of the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences, to broaden the contacts and the integration of work in the area of the study of basic and applied problems of clinical immunology with institutes of the clinical, biomedical and microbiological type of the USSR Academy of Medical Sciences and the USSR Ministry of Health; to intensify the work of the Problem Commission "Immunology" of the Scientific Council for Medical Problems of Siberia, the Far East and the Far North; to step up the work on the introduction in health care practice of the results of scientific research, which have been obtained by the institute in the process of fulfilling the plan of scientific research work; to draw up a plan of the preparation of candidate dissertations by the scientific associates of the institute, who do not have an academic degree, and to establish permanent control over its fulfillment.

The Presidium of the Siberian Department of the USSR Academy of Medical Sciences was instructed to consider the question of the possibility of transferring to the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences the scientific subdivisions, which are working in the area of experimental and clinical immunology, from the institutes of the department and, in particular, from the Institute of Clinical and Experimental Medicine; to expedite the settlement of the question of the establishment within the Institute of Clinical Immunology of the Siberian Department of the USSR Academy of Medical Sciences of a scientific polyclinic department; to take the necessary steps for the

strengthening of the material and technical base of the institute and its supply with experimental animals and working areas for their keeping.

The Presidium of the USSR Academy of Medical Sciences heard and discussed the report of Corresponding Member of the USSR Academy of Medical Sciences Yu. I. Kundiyev, the chairman of a commission, on the results of the comprehensive check of the activity of the Institute of Labor Hygiene and Occupational Diseases, as well as the supplementary report of Corresponding Member of the USSR Academy of Medical Sciences N. F. Izmerov, director of the institute.

The Presidium of the USSR Academy of Medical Sciences noted that the commission had devoted attention to all the aspects of the scientific and scientific organizational work of the institute. Its themes encompass basic and applied research, which is connected with the elaboration of the problems of labor hygiene and occupational diseases, and are aimed at the further development of the methodological and theoretical prospects of hygienic regulation of the adverse effect of factors of the production environment, as well as at the optimization of working conditions and the labor process.

The institute has highly skilled personnel and has good material and technical supply, which is making it possible to conduct research at a high scientific methods level. Some work is being performed on the introduction and development of new methods of research and on the evaluation of the quality and efficiency of scientific work.

As a result of the research 218 measures for introduction in health care practice and the national economy were elaborated, including a number of documents--38 standards of the system of labor safety, 19 public health regulations, 56 maximum permissible concentrations of industrial substances in the air of the work zone and others. The associates of the institute have been awarded 12 medals of the Exhibition of USSR National Economic Achievements. The Institute of Labor Hygiene and Occupational Diseases of the USSR Academy of Medical Sciences has performed work in accordance with 103 contracts on creative cooperation with industrial enterprises, organs of practical health care and others. In all 18 monographs, 13 collectives of works and 657 journal articles were prepared and published. Eight certificates of authorship for inventions and one patent certificate were received.

The institute is a center of the World Health Organization in the area of occupational hygiene and the national coordinator of the CEMA theme "Labor Hygiene and Occupational Diseases." At its base the project of the United Nations Environmental Program "The Control of the Danger of Chemical Substances for Man and the Environment" is being implemented and the Soviet toxicological center of the USSR Ministry of Health is operating. It is cooperating with scientific institutions of the GDR, the CSSR, Bulgaria, Hungary and Finland.

The institute, being the head one for the problem of union importance "The Scientific Principles of Labor Hygiene and Occupational Pathology," has carried out the planning and coordination of scientific research in this direction.

The commission identified individual shortcomings in the work of the institute and made a number of specific suggestions. The influence of production and occupational factors on the sick rate with temporary disability in the leading sectors of industry is being inadequately analyzed. It is necessary to broaden the themes on the elaboration of psychophysiological methods of the evaluation of types of labor, which cause nervous stress, and on the identification of the effect of production noise on the condition of the cardiovascular and nervous systems. The commission noted the need for the tightening up of the monitoring of the preparation of doctoral dissertations, which are devoted to questions of the modernization and standardization of priming equipment.

The Presidium of the USSR Academy of Medical Sciences agreed with the positive evaluation of the scientific and scientific organizational activity of the Institute of Labor Hygiene and Occupational Diseases of the USSR Academy of Medical Sciences, as well as with the conclusions of the commission. It was recommended to its director, Corresponding Member of the USSR Academy of Medical Sciences N. F. Izmerov, to take steps on the implementation of the suggestions made by the commission; to step up the participation of the institute and the problem commission in the work on the analysis of the causes of the sick rate with temporary disability in the leading sectors of industry; to draft a specific plan of the training of doctors of sciences in the problem for the 11th Five-Year Plan (by years) and to carry out the systematic monitoring of its fulfillment.

The Presidium of the USSR Academy of Medical Sciences heard the report of Academician of the USSR Academy of Medical Sciences G. N. Serdyukovskaya on the work of the Joint Coordinating Council of the USSR Academy of Medical Sciences and the USSR Academy of Pedagogical Sciences for the Problem "The Health, Rearing and Education of Children."

The Presidium of the USSR Academy of Medical Sciences noted that the Joint Coordinating Council of the USSR Academy of Medical Sciences and the USSR Academy of Pedagogical Sciences had done significant scientific organizational work, which completely conforms to the tasks which were indicated by the 25th and 26th CPSU congresses and the decrees of the CPSU Central Committee and the USSR Council of Ministers on the questions of the further improvement of public health care, as well as the improvement of the education and rearing of children. In past years a useful, working complex of scientific institutions of the medical and pedagogical type has been formed within the coordinating council.

The implementation of the decree of the joint session of the USSR Academy of Medical Sciences and the USSR Academy of Pedagogical Sciences (1978) on the problem "The Health and Rearing of Children of Preschool Age"; the formulation and the organization of the implementation of the long-term coordinating program of joint scientific work of the USSR Academy of Medical Sciences and the USSR Academy of Pedagogical Sciences "The Health, Rearing and Education of Children and Adolescents" for the period of 1980-1990, which includes 92 themes on basic and applied medical problems, of which 39 scientific research institutes and chairs are the performers, constituted the specific basis of its activity.

As a result of the established contacts between the head institutions and the coperformers of individual themes of the medical and pedagogical type, the extensive discussion of the subprograms and directions of scientific research, which are envisaged by the coordinating program, the procedural approaches to their accomplishment, as well as the forms of the introduction of the results of the scientific research the successful progress of the fulfillment of the program was ensured and in the past 2 years the elaboration of 12 medical themes has been completed. In accordance with the results of the conducted research a number of suggestions, including procedural instructions, diagnostic and treatment methods and supplements to the prevailing public health norms and regulations, were made for implementation in medical and pedagogical practice.

However, along with the successes in scientific and scientific organizational work there are also shortcomings, which concern the organization and conducting of medical research. The more extensive interinstitute and interproblem integration of scientific work within the coordinating program, the better monitoring of the performance of scientific research by subordinate performing institutes and the increase of attention to the questions of the introduction of the results of scientific development in the practice of health care and education, the constant making of an analysis of the obtained results and the checking of their efficiency during implementation are needed.

The Presidium of the USSR Academy of Medical Sciences approved of the report of Academician of the USSR Academy of Medical Sciences G. N. Serdyukovskaya on the work of the Joint Coordinating Council of the USSR Academy of Medical Sciences and the USSR Academy of Pedagogical Sciences for the Problem "The Health, Rearing and Education of Children" and noted the successful fulfillment of the medical scientific research which is being conducted within the coordinating program, which is of great importance for the improvement of the system of the protection of the health of the rising generation of the country.

The presidium considers expedient the convening of the third joint session of the USSR Academy of Medical Sciences and the USSR Academy of Pedagogical Sciences for the discussion of the results of the fulfillment of the coordinating program and the introduction of its results in the practice of the work of the USSR Ministry of Health and the USSR Ministry of Education.

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GENERAL

UPDATE BY SIBERIAN SCIENTISTS ON REGIONAL DEVELOPMENT OF RESOURCES

Moscow TRUD in Russian 28 Mar 85 p 2

[Article: "Siberia: Horizons of Development as Reported by Leading Scientists in the Siberian Department of the USSR Academy of Sciences"]

[Text] Today, Siberia is the main warehouse of the nation's natural resources. In a region that occupies 40% of the territory of the USSR there is concentration of 85% of the nation's energy supplies--petroleum, coal, natural and casing-head gas, water resources. Siberia has half the world's coal mines and one-fifth of the planet's forest stands. The role of Siberia in development of the national economy of the USSR is growing constantly. Scientists are making a large contribution to development of this region. The Siberia Program was formulated in the Siberian Department of the USSR Academy of Sciences; it is a set of scientific investigations and developments of a regional, intersectorial nature, the purpose of which is basic scientific validation and active cooperation in effective development of the natural resources of Siberia and development of its productive forces. The Siberia Program consists of six main directions: mineral resources, biological resources, regional economic programs, intersector programs of particular complexity, engineering and technological programs and power engineering of Siberia.

According to geologists, in the last 20 years of this century, as many minerals will be recovered from the depths of the Soviet Union as were recovered in the preceding 100 years. The center for recovery of virtually all types of raw materials has definitively shifted to Siberia. Further development of Siberia has obtained a scientifically validated and planned future.

Academician A. A. Trofimuk, first deputy chairman of SO AN SSSR [Siberian Department of the USSR Academy of Sciences] and chairman of the Scientific Council for the Siberia Program:

The executors of the Siberia Program are virtually all scientific research and experimental design divisions of the SO AN SSSR and more than 350 scientific research, planning-design and VUZ groups representing about 60 ministries and agencies under Union and republic jurisdiction. In the course of implementing the program, a new form of contact between science and industry appeared--large-scale special-purpose programs of long-term collaboration of scientific institutions with sectorial enterprises, planning and management bodies on Union, republic, kray and oblast levels.

Today, after 6 years of work on the Siberia Program, it can be firmly stated that its elaboration became a new step in programmed-special purpose organization of planning, financing scientific research and its use in the national economy. Some important results were obtained and the main problems have been outlined, on which Siberian scientists will have to work in the immediate future.

As an example, let us consider one problem, recovery of petroleum and gas. At present, the forecast for West Siberia is accompanied by an estimate of the structure of stock, validation of strategy of exploratory work and economic characteristics of resources. For the first time in worldwide practice, an economic map of the petroleum-gas complex was charted, which indicated the total and necessary expenditure of means and materials to develop the entire complex. Priority directions of concentration of exploratory work for petroleum and gas were singled out; recommendations were issued as to target dates and volume of regional and exploratory and prospecting geological-geophysical work in the designated regions.

Siberia is the largest forest region of the USSR. Following the Siberian Forests Program, Siberian scientists have developed and delivered to government bodies recommendations on forest management (rules for cutting trees, reforestation, protection of forests against pests and fires). Many of our proposals were included in the USSR Forest Code. Organization in Siberia of integrated farms responsible not only for use, but restoration of forests, as well as speedy construction of modern enterprises for waste-free processing of timber should be considered the main task in this program. Relevant plans and technological developments exist and will be prepared in the course of working on this part of the program.

Since addition of new land use in Siberia requires extremely large investment of capital for reclamation, the general line of development of agriculture there is viewed as drastic increase in labor productivity by means of improvement of the system of farming, introduction of new, highly productive cultivars and breeds of animals, refinement of technologies for agricultural production, storage and processing of its output. Investigations dealing with problems of intensification of agriculture are being conducted on the Siberia Program by institutions of the SO AN SSSR in close collaboration with organizations of the SO VASKHNIL [Siberian Department of the All-Union Academy of Agricultural Sciences imeni Lenin].

Recently, the Siberia Program acquired the status of a state program by the joint decree of the USSR State Committee for Science and Technology and Presidium of the USSR Academy of Sciences. By giving it such status, there are new possibilities for creative coordination of research and concentration of efforts of scientific organizations under different ministries and agencies to accelerate scientific and technological progress in this most important region.

As a result of development of Siberia there is the prospect of establishing tens, if not hundreds, of new cities and worker

settlements, combines, plants and quarries. Will industrial Siberia be able to feed itself in the future? "Yes, it will!" maintain the geneticists. Siberia is capable of producing so much food that it would be enough not only for residents of this region, but to supply to other parts of the country.

Academician D. K. Belyayev, director of the Institute of Cytology and Genetics, SO AN SSSR:

The natural conditions in Siberia impose special demands on cultivars and hybrids of agricultural plants. Production of the main grain crop--wheat--is thus far based exclusively on spring varieties, most of which were developed many years ago and require improvement. The geneticists and breeders of the SO AN SSSR and SO VASKHNIL, together with agricultural experimental stations are pursuing systematic work in this direction. The Novosibirskaya-67, which they developed, is being raised on an area of about 3 million hectares in 6 oblasts and krays of Siberia. A new mutant form of spring wheat, Soanovskaya, which retains the productivity of Novosibirskaya-67 but is more resistant to sprouting in windrows, which is particularly important under the usually rigorous conditions of harvesting in Siberia, has been handed over for state testing.

The problem of developing winter cultivars is extremely important and difficult for Siberian agriculture. At the present time, several promising varieties of feed rye have been developed, which are suitable for harvesting with machines. One of them, Sibirskaya Kormovaya winter rye is the first Siberian cultivar for specialized feed purposes. It provides a substantial compensation for the shortage of green fodder in the early spring. Moreover, after being mowed for green fodder, the rye is capable of growing again and permits obtaining a second harvest in the form of seeds. Since 1980, this cultivar has been assigned to rayons in 6 oblasts and krays of Siberia. Seed growing from this cultivar is being pursued at the base farms Iskitimskiy and Medvedskiy of the SO AN SSSR.

Winter forms of wheat have also been developed that are very hardy and highly productive. The Al'bidum-12 cultivar of winter wheat has been zoned for Altay Kray since 1982.

At the initiative of the Siberian Department, a unique biological facility was opened in Gornyy Altay, i.e., a large experimental farm that will solve problems of genetics, hybridization and domestication of animals. Work has already started there to produce a new type of hybrid beef cattle.

In this self-styled biological center for collective use, Siberian biologists must develop a system for optimum combination of intensive farming (which will always be done by man) with equally intensive and sophisticated system of environmental protection.

Problems of environmental protection and problems of development of agricultural production must be solved together. For this reason it is necessary, even now, to set up a unified biological monitoring service over the entire enormous

territory of Siberia. Use of modern means of investigating natural resources from satellites is one of the tests to develop such a system. Scientific-methodological bases for gathering and decoding such information are being developed within the limits of the Aerospace Studies of Natural Resources of Siberia Program by many institutes of the SO AN SSSR in collaboration with the Priroda State Center and other organizations of our country.

Scientists have estimated that man's nutrient requirements (in calories) are greater in a cold climate by an average of 20%. Overall standard cash expenditure to acquire clothing is about twice as high per person. The rigorous climate of Siberia also imposes special demands on medicine.

Yu. I. Borodin, academician of the USSR Academy of Medical Sciences, vice-president of the SSSR AMN [Academy of Medical Sciences] and chairman of the presidium of the SO AMN SSSR [Siberian Department of the USSR Academy of Medical Sciences]:

The Human Health in Siberia Program is administered by the SO AMN SSSR and RSFSR Ministry of Health. It is in essence a set of special-purpose theoretical and clinical biomedical, hygienic and sociohygienic problems. The choice of expressly these problems was not made by chance. They reflect best the entire experience of organizing research and many years of observations in newly developed regions.

Development of Siberia is made more difficult by the rigorous climate. Sophisticated technologies for recovery and processing of minerals are not always used, and this in turn affects the health of miners. The epidemiological distinctions of the region are rather complex and as yet poorly studied. There are many tasks. Medical science still owes much to the pioneers of Siberia.

Each region has its own biomedical image unlike any other. One should deploy the work on all levels of health care in accordance with its distinctions and taking into consideration the specifics of industry. After thorough investigations made by scientists of the Institute of Combined Problems of Hygiene and Occupational Diseases, they arrived at the conclusion that each region must have its own sociohygienic classification of a system of health care. This standardized document also includes the biomedical characteristics of the region. It spells out the general health care tasks and offers recommendations on wise deployment of work in its divisions. At the present time, sociohygienic classification has been made for Tuva ASSR, Novosibirsk and Tyumen oblasts, and Altay Kray. The scientists' recommendations help local public health workers organize efficiently medical care of the public, implement preventive measures with consideration of specifics of work, recreation and social relations.

At the present time, in the armamentarium of West Siberian health care broad use is made of our integrated maps of characteristics of the near-earth layer of the atmosphere, water resources, climate and meteorological conditions, indicators of public health status. The Five-Year Health Program, which was implemented and proved its viability in the Norilsk Industrial Region, resulted

from a scientific search for the means of systemic control of public health at a major industrial center, a territorial production complex. There was significant reduction in labor loss due to a number of diseases thanks to optimization of all elements of the life-support system.

Even today, information about the biomedical and sociohygienic status in some regions is being transferred to computers. Automated control systems equipped with special programs help public health organizers assign and use resources, personnel and equipment in a knowledgeable and economic way. A check of the reliability of innovations in public health care, as in no other sector of human endeavor, has been in progress for years. But even now it can be stated with certainty that the new form of organizing the health service with use of computers and achievements of the scientific and technological revolution has justified itself on the job.

Work pertaining to health care for worker groups occupies a special place in the investigations. Producers have already received from medical scientists typical solutions for optimum control of processes of labor safety and protection of the environment against industrial waste. Most of the recommendations served as the basis of the special Health of Metallurgists Program. At present it is being implemented with success in West Siberia.

In 1937, Academician I. M. Gubkin declared, at the International Geological Congress in Moscow, that our country has stock of billions of tons of petroleum. Foreign scientists asked with scepticism, where does Russia have such reserves? The Urals and Volga region augmented the nations petroleum recovery from about 30 to 300 million tons per year. Deposits in West Siberia have made it possible to exceed this level considerably. It is now time to hear from East Siberia.

M. M. Mandel'baum, doctor of geological and mineralogical sciences, chief geologist of the Irkutsk Geophysics Production Association:

West Siberia presently supplies more than half the All-Union petroleum and natural gas; it will retain its role as the greatest supplier of fuel at least to the end of this century. But the growing needs of the national economy demand that a search be made for new petroleum and gas resources. This was reflected in the decisions of the 26th CPSU Congress, which mentioned the necessity of finding hydrocarbon raw materials sources not only in West Siberia, but East Siberia.

The united efforts of scientific and industrial groups formed 6 years ago within the framework of the Petroleum and Gas of East Siberia Program yielded substantial results. On the basis of theoretical generalizations made under the supervision of A. A. Trofimuk, the Nepskiy anticline situated in the northern part of Irkutsk Oblast was singled out as a region where one can expect high effectiveness from a search for deposits.

In the period that has elapsed, thanks to introduction of new methods of analyzing deep soil within the limits of the Nepskiy anticline, it was

possible to lay the foundation within a short time for the most promising sites of petroleum and gas.

Not only Soviet, but worldwide practice had no experience in working with such specific territories that are difficult for prospecting for petroleum and gas as we encountered in East Siberia. There, the petroleum and gas-bearing rock is covered by volcanic rock. New procedures were required, such as, for example, combining two geophysical methods in a single entity--seismic prospecting and electric geophysical exploration. While the widely used indirect methods merely detect the sites of assumed location of deposits, the direct geophysical methods that are replacing them make it possible to obtain data with a greater degree of reliability concerning the site, configuration and size of deposits.

These methods, which were developed by scientists and specialists in the SO AN SSSR, scientific and production organizations of the USSR and RSFSR ministries of geology accelerated substantially the search for hydrocarbons. Thanks to their use, several new deposits were discovered and continue to be studied at the present time: Yaraktinskiy, Danilovskiy and others. Let me note that the wells drilled in accordance with data obtained by direct geophysical methods hit their targets in 70 out of 100 cases, i.e., petroleum beds (average incidence of hits when prospecting by ordinary methods is about 30 wells out of 100).

The Nepskiy anticline, as the central petroleum- and gas-bearing zone on the Siberian platform became a magnet, a sort of reference point for our neighbors, workers of Yakut ASSR and Krasnoyarsk Kray who are vigorously developing a search on the slopes of this anticline. Some interesting discoveries were made by the Krasnoyarsk prospectors in the central regions of that kray. A gas-condensate deposit was discovered at the sites of the supposed impact of the Tungusskiy meteorite.

Organizations referable to six different agencies are working on problems of oil and gas of the Siberian platform: USSR Academy of Sciences, USSR Ministry of Geology, Ministry of the Petroleum Industry and Ministry of the Gas Industry, RSFSR Ministry of Higher and Secondary Specialized Education, as well as expeditions and parties of five industrial geological administrations of the RSFSR Ministry of Geology. Work on a common program creates a special psychological climate and forms of interaction between research and industrial groups thanks to which the entire process of scientific developments and their introduction becomes continuous and mutually enriches its participants in knowledge and experience.

When mining began for ore in Norilsk and coal in the Kuznetsk Coal Basin, "technology" was based on the wheelbarrow, pickax, crowbar and shovel. At the present time, 450-horsepower bulldozers and 180-ton dumptrucks are working at the mines. But there is a problem, the "equipment" of the premachine era was more reliable.

M. F. Zhukov, corresponding member of the USSR Academy of Sciences, deputy director of the Institute of Thermophysics, SO AN SSSR:

The national economy of our country is suffering great losses measurable in millions of rubles per year only because of incompatibility of equipment and materials with the extreme conditions in the north. The fact of the matter is that at temperatures below -40 that are typical of many regions in the settled North (including the route of the Baykal-Amur Railroad) there is drastic increase in breakdown of machinery parts and entire units, and work stoppage at drilling installations. According to the data of the Institute of Physical and Technical Problems of the North, of the Yakut Affiliate of SO AN SSSR, breakage of machinery parts and elements, as well as equipment, increases by 4-6 times in the winter, as compared to the summer. One could reduce unwarranted expenses and thereby avoid increasing losses (one should not forget that the settled part of Siberia is growing annually) only by developing materials (and then equipment) that can withstand the burden of extreme northern conditions.

Work dealing with prevention of corrosion of metal parts, restoration of worn machinery parts and augmenting the resources for machine operation is very important. Thus, in order to further increase recovery of oil and gas it is necessary to accelerate prospecting work and this is sometimes delayed by the need for frequent replacement of drilling equipment due to its inadequate wear resistance. Such a problem is also facing construction workers in Siberia and the Extreme North for recovery of ore and nonore minerals, since equipment has to be operated frequently in the presence of frozen, abrasive and very hard rocky ground. It is important not only to increase the durability and wear-resistance of reinforcement materials, but to replace scarce diamonds and hard alloy compounds of tungsten with cheaper hard alloys.

Scientists are also faced with the task of developing technologies that would provide for maximum possible processing of raw materials. This would permit reduction to a minimum in volume of toxic compounds alien to nature that would be dumped into the environment. Unfortunately, there are still no industrial technologies that are in harmonious equilibrium with nature. Destruction of the natural balance that was formed for millions of years is occurring rapidly on the entire planet.

Within the framework of the New Materials and Technologies Program, institutions of the SO AN SSSR, USSR Ministry of the Chemical Industry and Ministry of the Petroleum Refining and Petrochemical Industry developed and have made a successful industrial trial of processing liquid and tar-like organochlorine waste from the chemical industry into a useful product. It is based on a plasma-chemical process and appropriate equipment.

The soils of Siberia require phosphorus fertilizers and deoxidation. The traditional method of processing phosphates with use of sulfuric acid will virtually not be applied in Siberia in the next 20 years for a number of reasons, one of which being the lack of sulfuric acid. Nitric-acid extraction with recovery of nitrophosphate is a more progressive method. However, in order to obtain nitric acid by the existing ammonia method one needs hydrocarbon raw materials (natural gas, oil), which have a tendency toward growing

more expensive and are not always close to the phosphorite deposits. In this regard, there is an interesting method of nitric acid production by means of direct fixation of nitrogen with oxygen in plasmotrons, using only atmospheric air, water and electricity.

The institutes of the SO AN SSSR, together with institutions under the Ministry of the Petroleum Refining and Petrochemical Industry and Ministry of Fertilizers have developed, within the framework of the Siberia Program, and submitted to laboratory testing the entire cycle from the plasma method of producing nitric acid to recovery of liquid or solid nitrophosphorus fertilizers. They were tested in the field and demonstrated high agrochemical qualities.

The Arctic zone, most of which is in Siberia, constitutes 40% of our country. We would see nothing but white space, but scientists assume that if nature arranged for more or less uniform distribution of its assets, it means that 40% of the nation's mineral and raw materials resources are beyond the polar circle.

Academician A. G. Aganbegyan, director of the Institute of Economics and Organization of Industrial Production of SO AN SSSR:

The Siberia Program has been in effect for 6 years already. In this time, remarkable changes have taken place in the economic life of this region. With such a scale of work, it is particularly important to foresee the future, develop reserves for it in good time and prepare conditions for further dynamic development of the fuel and energy base of Siberia.

Almost half the funds allocated for development of the fuel-energy complex of Siberia are presently used to transport fuel. After all, about 80% of the fuel recovered here is hauled over the Ural range to the west. In order to additionally improve the effectiveness of the national economy, it would be expedient, as written in the decisions of the 26th Party Congress, to concentrate in Siberia power- and electricity-consuming sectors that are based on deep processing of Siberian raw materials, ferrous and nonferrous metals, hydrocarbons and chemical raw material, as well as timber. And this energy-consuming sectors are indeed undergoing predominant development in Siberia: the aluminum industry is expanding, the Nadezhdinskiy Metallurgical Plant has been started up in Norilsk, development of electrometallurgy has begun in Siberia, Tomsk Chemical Plant has been started up, the Tobol Petrochemical Combine is being started up, there has been considerable expansion of pulp production and large hydrolysis plants are under construction.

All of the problems of future development of Siberia must now be considered from the standpoint of changing the national economy to the route of intensive development. The greatest national economic effect in many parts of Siberia and, first of all, in development of the territorial production complexes in the Angara-Yenisey river region, could be obtained if the "top" stories of industry are built. They should be oriented toward combined and deep processing of recovered raw materials. In particular, the efficiency of the timber complex could be improved by 2-3 times with organization of deep processing of timber, including pulp and hydrolysis production in regions of the lower

Angara and Central Yenisey rivers. Thus far, there is only sample tree-cutting there and everything is aimed only on sawmill operation with loss of more than two-thirds of the timber.

The scientists at the SO AN SSSR are developing the scientific bases for an integrated special-purpose program of economic development of the zone of the Baykal-Amur Railroad. Solution of this problem cannot be postponed, since passage over the entire route has been provided. In recent years, geologists have discovered new, effective deposits of mineral raw materials on the enormous territory of the Baykal-Amur Railroad zone, which covers 1.5 million square kilometers. We refer to oil and gas deposits in the north of Irkutsk Oblast and adjacent parts of Yakut ASSR, a new province of potassium salts in the north of Irkutsk Oblast, the Kholodninskoye complex ore and synnyrites (raw material containing aluminum and potassium oxides) in northern Buryat ASSR. Next to the copper ore of the famous Udkan in the north of Chita Oblast, good deposits of coal and valuable metals have been discovered. A new extremely large iron-ore region has been explored--Charo-Tokinskiy. If we add to this the already known large resources of commercial timber in the region of the Upper Lena River, Amur Oblast and Khabarovsk Kray along the route of the Baykal-Amur Railroad, the coal, iron-ore, apatite and other resources in the south of Yakut ASSR, it will become obvious that it is possible to establish a new industrial belt in the long-term future.

The scientists are also working on problems of the more remote future. We have started in earnest on development of a program for development of natural resources of the Arctic region in connection with the possibility of organizing year-round navigation over the northern sealane. There too, major territorial production complexes will appear in time: in the region of the North Ob River, including recovery of petroleum, gas, condensate, power and, perhaps gas chemistry; North Yenisey River region, including the Norilsk industrial region, an extremely large timber processing complex in Igarka and the world's largest future hydroelectric power station in Turukhanskiy.

And while heretofore, one only quoted the beginning of the famous Lomonosov statement, "Russian power will be augmented by Siberia....," at present we are entitled to add its second part, "... and by the Arctic Ocean."

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GENERAL

ECONOMIC STIMULI OF TECHNICAL PROGRESS, PRODUCT QUALITY

Moscow EKONOMICHESKAYA GAZETA in Russian No 6, Feb 85 pp 11-14

[Article: "The Economic Stimuli of Technical Progress and Product Quality";  
passages rendered in all capital letters printed in boldface in source]

[Text] During the 1984-1985 school year the course "The Economic Mechanism: The Economic Experiment in Industry" is being studied in the system of the economic education of workers. The standard syllabus of this course was published in No 31 of our weekly for last year, the materials on the first and second themes were published in Nos 42 and 47 for last year.

The educational issue on the third theme "The Economic Stimuli of the Increase of the Technical Level of Production, the Improvement of Product Quality" is published below.

"Highly productive equipment, which is multiplied by the universal economic interest in its use--that is just what, strictly speaking, can make the imminent economic change a reality, can ensure the combination of the two revolutions--the scientific and technical and the social, and can reveal with new force the advantages of the socialist organization of production."

K. U. Chernenko  
From the article "To the Level of the Requirements  
of Mature Socialism"

The 26th party congress posed the task to ensure profound qualitative changes in the material and technical base on the basis of the acceleration of scientific and technical progress, the intensification of production and the increase of its efficiency in all the sectors of the national economy. It was deemed necessary to pursue consistently the policy of the more rapid retooling of production, the development and production of machines and equipment, which make it possible to improve working conditions and to increase labor productivity, to save material resources. The importance of bringing all the sectors of the national economy up to the leading levels of science and

technology was emphasized in the decisions of the congress and the subsequent CPSU Central Committee plenums.

Under the conditions of socialist society fundamental peculiarities exist in the use of the achievements of science and technology. Under socialism, in which the public ownership of the means of production prevails and the economy is developed in the interests of increasing the material well-being and culture level of the working people, all the achievements of science and technology serve the accomplishment of this noble task.

Much economic, organizing and party political work is needed for the realization of the advantages of socialism in the area of scientific and technical progress. It is necessary to pursue a unified technical policy and to enlist all labor collectives and all working people in the drive for the acceleration of scientific and technical progress.

In the decree of the CPSU Central Committee and the USSR Council of Minister "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" (August 1983) it is stressed that party, soviet, economic, trade union and Komsomol organizations are called upon to improve radically all the work on the acceleration of scientific and technical progress. The goal of such work is to ensure in the next few years the output of products which conform to the best current models, which will make it possible to substantially increase labor productivity in the national economy. The increase of the responsibility of collectives for the fulfillment of the plans and assignments on the development of science and technology to a considerable degree will contribute to this.

In Article 10 of the USSR Law "On Labor Collectives and the Increase of Their Role in the Management of Enterprises, Institutions, Organizations" it is stated that labor collectives take steps on the acceleration of scientific and technical progress and the extensive introduction of the achievements of science, new equipment and advanced technology.

The introduction of the achievements of science and technology is envisaged in the national economic plans. The Comprehensive Program of Scientific and Technical Progress for 20 Years, which is an important form of its long-range planning in the USSR, holds an important place. The preparation of this program is being carried out by the USSR Academy of Sciences, the USSR State Committee for Science and Technology and the USSR State Committee for Construction Affairs.

The role of the five-year plans of the planning of the development of science and technology is increasing noticeably. A special section--"The Development of Science and the Acceleration of Technical Progress"--is singled out in the plan of the 11th Five-Year Plan.

The comprehensive programs on the solution of the most important scientific and technical problems hold particular importance in planning. The goal of such programs is the meeting of the needs of the national economy for new types of equipment and new products. The programs are drawn up in the most important basic directions of scientific and technical progress. During the

11th Five-Year Plan 170 state comprehensive scientific and technical programs were formulated and are being implemented. These programs encompass a broad range of research and development, which are aimed at the development of the fuel and power and the agroindustrial complexes, machine building, the chemical industry, metallurgy, transportation, health care and consumer goods production. They envisage the cooperation of many organizations, enterprises and scientific research institutes of various ministries and departments in the process of solving scientific and technical problems.

Under the conditions of the experiment assignments, which are aimed at the acceleration of scientific and technical progress and the development, assimilation, introduction and expansion of the use of new equipment and technological processes, are being established in the five-year and annual plans of associations (enterprises).

Passports of associations and enterprises have become a significant factor which is contributing to the better use of the production potential. They make it possible to objectively characterize the production capacities and to identify the reserves of the increase of the amount of work by means of technical renovation and the overcoming of bottlenecks. However, the work on the compilation and updating of passports has not yet been developed equally at all enterprises.

#### The Planning and Stimulation of Scientific and Technical Progress Under the Conditions of the Experiment

The broadening of the independence and responsibility of enterprises during the large-scale economic experiment presumes the creation of the main condition of efficient management--the increase of the technical level of production. This means, on the one hand, the accomplishment of the technical reorganization of production and the modernization of equipment, the improvement of technology on the basis of the introduction of the achievements of science and technology; on the other hand, the output of new, highly efficient products and the improvement of their quality.

In the plans of associations (enterprises) the following indicators on scientific and technical progress, as a rule, are approved:

- the production of output in physical terms, including items of new equipment;
- the assignments on the development, assimilation, introduction and expansion of the use of new equipment and technological processes;
- the proportion of products of the highest quality category in the total volume of output of products.

These indicators are told about in detail in the educational issue which was published in EKONOMICHESKAYA GAZETA, No 47, 1984.

The rights and opportunities of enterprises in the area of retooling are being broadened substantially during the conducting of the economic experiment. A

number of problems, of which the main one is the determination of the sources of financing of such operations, as well as the establishment of the forms and methods of their material supply, are being solved here.

For a long period of time the question of the broadening of the rights of enterprises in obtaining assets for retooling and their use has been raised.

At present in industry such assets are being singled out: at enterprises there is a production development fund which amounts to about 9 billion rubles. However, in accordance with the prevailing methodology of planning it is "drawn into" the total amount of centrally regulated capital investments.

Under the conditions of the experiment the state of affairs in this area should change radically. The task has been posed that the amount of assets for the maintenance of productive capital at the necessary technical level, that is, for the retooling of enterprises, would depend on the results of their economic activity. For the solution of this problem the expenditures with respect to the development fund are being separated from the total amount of capital investments and are envisaged separately in the state plan in the form of noncentralized capital investments. This required a change of the methods of planning at all levels: in the USSR State Planning Committee, in ministries and departments, at all-union industrial associations, at production associations and enterprises.

When performing this work it is especially important to proceed from the fact that noncentralized capital investments are not secondary, not ancillary operations. They should have equal importance along with centralized capital investments. Practical experience shows that in those instances, when the collectives of associations and enterprises have the opportunity to promptly perform the operations on retooling, these expenditures, as a rule, provide the greatest impact, the greatest yield.

The singling out in the balances of the national economy and in the entire system of material and technical supply of the corresponding material resources, and first of all equipment, is envisaged for the performance of work by means of assets of the production development fund. In the decree of the CPSU Central Committee and the USSR Council of Ministers on the conducting of the experiment, which was adopted in July 1983, it is specially emphasized that the assets of the development fund should be backed with material resources in the same manner as for centralized capital investments.

Hence, of course, follow a number of new demands which are being made on the planning of construction operations. It is a question first of all by what forces these operations should be carried out. It is necessary to proceed from the fact that enterprises should develop extensively the method of construction using their own resources, should strengthen its material and technical base, should enlarge the scale and increase the quality of the work of their construction organizations. Contractual operations, which are envisaged in the plan and are liable to mandatory fulfillment, can be used for the accomplishment of retooling.

Here is how the system of the formation of production development funds looks in the Ministry of the Electrical Equipment Industry, which has been working under the conditions of the experiment since 1 January 1984. Unified standards of deductions for this fund from the profit, which are equal to 8.1 percent, have been established with respect to the ministry. Moreover, 40 percent of the amortization deductions for renovation are being channeled into it. An analogous pattern of deductions from the profit for the development fund has also been established with respect to the Ministry of Heavy and Transport Machine Building, in which the standard of the deductions is equal to 6 percent.

Given such an approach to the formation of the production development fund a dependence of the fund on the results of the work of the collective and on the scale of the used equipment is established.

At the same time a number of questions require further study and additional analysis.

For the purpose of improving the formation of the production development fund starting in 1985 substantial changes have been made in the procedure which was previously in effect. It is possible to systematize these changes in the following directions:

--FIRST, it is specified that the production development fund, just as the other funds (the material incentive fund, as well as the fund for sociocultural measures and housing construction), is formed on the basis of the size of the fund, which is formed in accordance with the plan of the base year and the sum of the increase of the fund, which is calculated for each percent increase of the profit as compared with the base year. Thus, the development fund will now depend to a significantly greater extent on the increase of production efficiency, which found reflection in the indicator of the profit. Consequently, the requirement: the better an enterprise works, the more assets it receives for the development of production, will be realized to a greater extent;

--SECOND, the system of amortization deductions, which are intended for the complete replacement of the fixed production capital and for the purposes of the development of production, has been streamlined. Previously, prior to the experiment, a different procedure of these deductions was in effect at enterprises: in some cases approximately half of the amortization was channeled into the production development fund, in others--a third, in still others--an extremely insignificant share.

Therefore, starting in 1985 in the sectors, which are in the experiment, a unified norm has been introduced for all enterprises: for machine building the deductions for each enterprise should be not less than the amount which corresponds to the share of the amortization deductions in the production development fund, which was formed for the ministry as a whole in accordance with the plan for 1984. If, for example, in the ministry as a whole 40 percent of the amortization deductions, which are intended for renovation, are channeled into the production development fund, each enterprise should calculate the amounts of the deductions on the basis of the indicated

proportion. An approximately equal base of the production development fund is thereby created for the enterprises of the ministry.

THIRD, with the broadening of the experiment in 1985 the question of a specific differentiation of the deductions for the purposes of the renovation of production subject to the technical level of the fixed capital has been specified. Given an identical approach to all enterprises the collectives, which worked on relatively new equipment, found themselves in a more favorable position.

True, under the conditions of the experiment the ministries can by means of centralized capital investments correct the situation and allocate these assets to a greater extent for those enterprises which have an extreme need for them. At present it is advisable to solve this problem by means of a system of the differentiation of standards. Here, as in other cases, such differentiation should be organized on a firm economic basis, in the form of a strict and clear dependence on individual factors.

The Ministry of Heavy and Transport Machine Building, for example, after serious scientific research and substantiations developed a special scale of the differentiation of the standards of deductions for the development fund subject to the degree of wear of the fixed capital by enterprises. This is also completely justified because operating enterprises, which are in a different situation with the replacement of fixed capital, are taking up the experiment. This factor, obviously, must be taken into account in the entire system of management in the future as well.

During the experiment varied experience of the use of the production development fund for the purposes of retooling has formed. Thus, at the Vilnius El'fa Production Association of the Ministry of the Electrical Equipment Industry the assets for technical development were divided into two parts: one--along the lines of centralized capital investments (1.9 million rubles) and the other--by means of noncentralized capital investments (the development fund, 1.7 million rubles). While at the Vil'nyuselektrosvarka Association the development fund completely meets the needs for assets for retooling.

Subsequently, obviously, the share of the assets for retooling at the expense of the production development fund will increase everywhere at all enterprises.

The question of increasing the dependence of the production development fund on the end results of work, particularly the profit, is now being considered. At present the share of the increase of the fund due to the profit in its total amount is still negligible. Thus, for the Ministry of the Electrical Equipment Industry the additional increase of the fund through this factor comes to a little more than 3 percent of the total annual amount of the planned fund. A search is under way for such methods of ensuring a connection of the development funds with the end results of production, which would fit the overall task: to make their amount and scale dependent on the end results.

Under the conditions of the experiment the structure of capital investments is also changing accordingly. As has already been stated, a new direction--noncentralized capital investments, the amount of which during the first year of the conducting of the experiment was already significant--has appeared.

At the enterprises of the Ministry of Heavy and Transport Machine Building, for example, in 1983 the proportion of the development fund in the total amount of assets for retooling came to 50 percent, while in 1984 it came already to 68 percent.

In the Ministry of the Electrical Equipment Industry in 1985 70 million rubles more will be allocated from the production development fund for retooling than in 1983. In the future the share of internal sources for retooling will increase.

A new feature in the broadening of the opportunities of enterprises to carry out retooling and the modernization of equipment is the fact that for these purposes it is now permitted to use a portion of the assets which are intended for capital repair. At present at enterprises these assets have been accumulated in significant amounts. As practical experience shows, in a number of instances it is more efficient to allocate a portion of these assets not for the repair of obsolete equipment, but for its replacement with more advanced, highly productive equipment. Therefore the switching of a portion of the assets, which have been accumulated for capital repair, to the replacement of equipment and the implementation of measures on the modernization of production, undoubtedly, should contribute to the acceleration of technical progress.

During the conducting of the experiment enterprises are being afforded greater opportunities to use bank credit for the retooling of fixed capital. In the decree of the CPSU Central Committee and the USSR Council of Ministers on the conducting of the experiment it is envisaged, first, that enterprises can obtain credits in case of a payback period of the measures, for which credit is extended, of up to 6 years from the day of the issuing of the first loan; second, the repayment of the credit for retooling should be carried out by means of the assets of the production development fund and, in case of its insufficiency, by means of the above-plan profit which it left at the disposal of the enterprises. This enables the enterprises to make good use of the amounts of assets for retooling. The state will also be able to ensure effective monitoring of the efficiency of the use of the indicated assets and the repayment of credit.

#### Facts and Figures

Number of Scientists in the USSR  
(millions)

1980

1.4

1984

about 1.5

**Number of Developed Models of New Types of Machines, Equipment,  
Apparatus, Instruments and Automation Equipment  
(thousands)**

1980	1984
3.6	3.8

**Availability at Industrial Enterprises of Installed Mechanized Flow  
and Automatic Lines  
(thousands, on 1 July)**

1979	1983	1984
160.6	184.1	over 195

**Number of Completely Mechanized and Automated  
Sections, Shops, Works  
(thousands, on 1 July)**

1979	1983	1984
83.5	97.2	over 102

**According to the Data of the USSR Central Statistical Administration**

In 1984 10,500 NC metal-cutting machine tools were put into operation, 75 model demonstration sections, which are equipped with industrial robots, and 19 completely mechanized computer-controlled sections for the machining of parts were set up.

The use of metal-saving technologies in machine building was expanded, the stock of advanced metalworking equipment increased.

In 1984 15 scientific discoveries were registered, more than 24,000 inventions and about 4 million efficiency proposals were used in the national economy.

**An Example of the Calculation of the Production Development Fund for an Association (Enterprise)**

**I. Initial Data**

**The Standards of the Increase of the Production Development Fund:**

- |   |    |
|---|----|
| I.1. For each percent increase of the profit, percent   | 1  |
| I.2. For each percent increase of the amortization deductions,<br>which are intended for the complete replacement of fixed<br>production capital, percent | 1  |
| I.3. The increase of the profit according to the plan in 1985<br>as compared with the 1984 plan, percent  | 19 |

I.4.	The increase of the amortization deductions, which are intended for the complete replacement of fixed production capital, according to the plan in 1985 as compared with the 1984 plan, percent	6
I.5.	The proportion of the amortization deductions, which is channeled into the production development fund for the ministry as a whole according to the plan for 1984, percent	37.9
I.6.	Planned production development fund for 1984 (due to deductions from the profit and amortization), thousands of rubles	3000

Including:

I.7.	Due to deductions from the profit, thousands of rubles	1000
I.8.	Due to amortization deductions, which are intended for the complete replacement of fixed production capital, thousands of rubles	2000
I.9.	Receipts from the sale of retired and unnecessary property for 1985, thousands of rubles	50
I.10.	Amortization deductions, which are intended for the complete replacement of fixed production capital for 1985, thousands of rubles	9600

II. The Calculation of the Planned Production Development Fund for 1985

The Calculation of the Increase of the Production Development Fund:

II.1.	Due to the deductions from the profit, thousands of rubles (line I.7 X line I.3 X line I.1)/100	$(1000 \times 19 \times 1)/100 = 190$
II.2.	Due to the deductions from amortization, thousands of rubles (line I.8 X line I.4 X line I.2)/100	$(2000 \times 6 \times 1)/100 = 120$
II.3.	The calculated production development fund due to deductions from the profit and amortization, thousands of rubles line I.6 + line II.1 + line II.2	$3000 + 190 + 120 = 3310$
II.4.	The distribution of the amount of the planned production development fund, which corresponds to the average amount of the amortization deductions, which are intended for the complete replacement of fixed production capital and are channeled into this fund, for the ministry as a whole according to the plan of 1984 (Paragraph I.1 of the Statute), thousands of rubles (line I.10 X line I.5)/100	$(9600 \times 37.9)/100 = 3638.4$

II.5	The planned production development fund, which was specified in conformity with Paragraph I.1 of the Statute (line II.3 is compared with line II.4. The production development fund, which is larger than according to line II.3, is taken to be equal to the amount obtained according to line II.4), thousands of rubles	3638.4
II.6	The total production development fund according to the plan with allowance made for the receipts from the sale of retired and unnecessary property, thousands of rubles line II.5 + line I.9	$3638.4 + 50 = 3688.4$

#### The Unified Fund for the Development of Science and Technology

The interest and responsibility of enterprises in the introduction in practice of the achievements of science and technology are increasing.

Substantial steps in this direction are being made at the enterprises which are working under the conditions of the experiment. In addition to steps on the acceleration of the introduction of scientific and technical achievements, which have been taken at all enterprises, the following is envisaged when conducting the experiment. First of all the opportunities of enterprises to use the assets for the recovery of the expenditures connected with the introduction of what is new and advanced are being broadened. In particular, the enterprises are granted the right to use a portion of the assets of the unified fund for the development of science and technology. Prior to the changeover to the conditions of the experiment the enterprises transferred all these assets to the disposal of the ministries, and then turned to the ministry with the request to allocate to them a portion of the resources. Now the ministries should during the preplanning period report to the enterprises (especially large ones) the share of the deductions for the unified fund, which is being left at their disposal for the performance on their own initiative of planning and design operations on the development of new equipment, as well as for the meeting of the increased expenditures during the period of its assimilation.

During the formulation of the plan the enterprises received at their own disposal real assets for the meeting of the expenditures on the assimilation and introduction of new equipment.

Much work on the formation and use of the unified fund for the development of science and technology has been done in the Ministry of the Electrical Equipment Industry. Here a significant portion of the assets of this fund is now being allocated to enterprises for the performance of enterprises planning and design operations on the development of new equipment and for the offsetting of the increased expenditures during the period of its assimilation. The amount of assets, which were allocated in 1984 for these purposes, was increased by 23 percent.

The analysis of the distribution of the assets of the unified fund for the development of science and technology shows that these questions have been settled most efficiently in the Ministry of Heavy and Transport Machine Building, as well as in the Belorussian Ministry of Light Industry. Here the amounts of assets of this fund, which are delivered to the enterprises, have been clearly specified since the very beginning of the experiment. As a rule, these assets are allocated for the meeting of the expenditures, which are connected with the preparation of production and the performance of experimental design operations. At individual enterprises a significant portion of the assets of the fund is used for offsetting the increased costs which are connected with the series production of new types of equipment.

For example, at the Novokramatorskiy mashinostroitel'nyy zavod Production Association the assets of the unified fund for the development of science and technology were used in the following manner: for the payment for economic contractual scientific research and design operations--approximately 40 percent, for the performance of such operations on its own--more than 30 percent, for the preparation of the production of new products--22 percent, for the increase of the quality of items--6 percent. Obviously, the experience of such enterprises in the use of the unified fund must be carefully studied and disseminated. Unfortunately, the assets of this fund are still being used too little for the offsetting of the increased costs which are connected with the assimilation of new types of items.

#### The Formation of Wholesale Prices

During the conducting of the economic experiment in machine building sectors the rights of associations (enterprises) in the formation of the wholesale prices for semifinished products, assemblies and parts for intraministerial consumption were broadened. Moreover, significant rights were given to the ministry in the establishment of the prices for prototypes (test runs) of items, as well as wholesale price surcharges.

Here is how, for example, these new rights, which were granted to the Ministry of Heavy and Transport Machine Building, look. It is envisaged that the wholesale prices for semifinished products, assemblies and parts for intraministerial consumption are approved by the manager of the enterprise in consultation with the client. In the procedural statutes, which were approved on this issue, one stipulation is made: the profitability in this case should not exceed 43 percent of the product cost less the cost of the material resources used for the production of items. The ministry intervenes in these matters only when there are differences on the question of the level of prices between the enterprise and the client.

The rights of enterprises in case of the approval of the wholesale prices for prototypes (test runs) of items for production engineering purposes have also been broadened significantly. The manager of the enterprise also has the right to approve independently the price (or the markup on it) in those instances when in case of the production of an item changes have been made in it at the request of the client. More rights have also been granted to enterprises in the establishment of wholesale price surcharges for the

improvement of individual technical and economic indicators and other consumer properties of products.

The broadening of the rights of associations (enterprises) in the area of pricing is contributing to the output of products of higher quality and the more complete meeting of the demand of consumers.

These rights are being actively exercised at light industry enterprises of Belorussia. Here in 9 months of 1984 the prices of nearly 301 test runs of goods were approved. Practical experience shows that these items, as a rule, received the high rating of customers. The establishment of markups is monitored by the ministries.

The work at the enterprises of the Belorussian Ministry of Light Industry on the increase of the production of new goods of improved quality with the index "N" has been stepped up. The plans of the production of their goods have been exceeded considerably, while the level of the preceding year was exceeded by more than 60 percent. The ministry regularly considers the possibilities of granting the right to establish temporary price markups to those enterprises which are achieving the highest indicators on production quality. In the republic the Mogilev Pilot Experimental Shoe Factory, the Orsha Foam Combine and other enterprises now enjoy this right.

As a whole the enterprises of Belorussia have received a significant incentive owing to the output of goods of increased quality. An additional 19 million rubles have been deducted for the material incentive funds just for the production of new goods of improved quality (with the index "N").

At the enterprises of the republic they are also beginning to introduce measures of liability for the output of products of low quality. So far these measures have not yet acquired a broad scope, but it is already possible to note during 1984 a number of enterprises, at which the deductions for the material incentive fund have been reduced by 3 percent for every percent of returned low quality products. There are cases of the decrease of the profit of enterprises for the downgrading of products. This concerned, in particular, the Minsk Luch Production Association and the Zhlobin Artificial Fur Production Association.

All these changes are aimed at facilitating the process of coordinating the new wholesale prices with respect to those items and types of operations, which do not require the intervention of central organs. This is increasing substantially the initiative of labor collectives and will make it possible to solve more efficiently many important and urgent problems of technical development. In the end all this is conducive to the acceleration of the introduction in production of scientific and technical achievements.

#### The Material Stimulation of the Assimilation and Introduction of New Equipment

A set of measures on the increase of the material interest of managers and engineering and technical personnel in the assimilation and introduction of new equipment and in the output of high quality products, as well as on the

increase of the responsibility for the implementation of these measures is being implemented. For this purpose:

--FIRST, the payment to managerial personnel in accordance with the results for the year of one-time bonuses in the amount of up to three salaries (in excess of the established maximum amounts of bonus payments) for the development and output of products, which according to the quality indicators conform to the world technical and economic level or exceed it and satisfy the long-range demands of consumers, is permitted. These bonuses are paid from the material incentive fund on the condition of the complete fulfillment of the plan assignments on the volume of product sales with allowance made for the obligations on deliveries in conformity with concluded contracts;

--SECOND, the right is granted to the managers of scientific research, design, planning and technological organizations of the ministries of heavy and transport machine building, as well as the electrical equipment industry to pay specialists bonuses for the development and production of competitive products in the amount of up to three salaries a year (in excess of the bonuses envisaged by the prevailing statutes);

--THIRD, increased material liability for the nonfulfillment of the plans and assignments on the development and assimilation of new equipment and the introduction of advanced technology and advanced know-how has been established. In particular, the amount of the bonuses for the managerial personnel of enterprises for the basic results of economic activity is reduced by not less than 25 percent;

--FOURTH, the machine building ministries have been granted the right to earmark assets for the payment of bonuses to workers of enterprises of other ministries for the early and high quality completion of contractual operations on the development, assimilation and introduction of new equipment. The indicated assets should be transferred from the centralized bonus fund for the development and introduction of new equipment. Owing to this an increase of the interest of related enterprises and sectors in the solution of vital problems of technical progress is being achieved.

#### Product Certification

For the purpose of implementing the adopted decisions on the acceleration of scientific and technical progress work is being performed on the improvement of the certification of product quality. The State Committee for Standards jointly with other departments in February 1984 approved a new procedure of the certification of items, which has already been put into effect. The elimination of the second quality category is, in essence, the most significant differences of the approved procedure from the procedure previously in effect. Here the obligatoriness of tests of the product being certified in case of its evaluation has been introduced. It is very important that the state certification commissions evaluate a product according to not only the highest, but also the first quality category.

In this connection in case of the certification of the most important national economic products the indicated commissions should be headed without fail by a

representative of the State Committee for Science and Technology. The State Committee for Science and Technology and the USSR State Planning Committee have approved in accordance with the representation of ministries a list, which is of the greatest national economic importance, of types of machine building products which are liable to certification in the above-indicated manner.

The machine building ministries, which are participating in the experiment, should in the immediate future complete the state certification of the machines, equipment and instruments, which have been included in the list of types of machine building products, which is of the greatest national economic importance. Accordingly it is necessary to use actively wholesale price reductions for machine building products which have not been certified as being of the highest or first quality category.

#### The First Results

Of course, too little time has passed to speak about the effect of the experiment on technical progress. Changes in technology, equipment and the organization of production are required for this. Nevertheless during the first period of work under the new conditions the attention of labor collectives to new equipment and the retooling of equipment has been increased noticeably.

The new possibilities of retooling are being used extensively at light industry enterprises of Belorussia. Here due to the implementation of measures on the technical improvement of production more than 2,000 people have been relatively freed, the cost of the output being produced has been reduced by nearly 6 million rubles.

At local industry enterprises of Lithuania the more extensive opportunities to use assets for retooling have made it possible to introduce 235 measures on advanced technology, as well as the mechanization and automation of production. The economic impact obtained from the introduced efficiency proposals and inventions has also increased significantly.

The expenditures on the production of output have been decreased, labor productivity is increasing. Thus, the Ministry of the Electrical Equipment Industry reduced the production cost of industrial products in 1984 by 1.33 percent. The calculations show: measures on scientific and technical progress provided up to two-thirds of the decrease of the production cost.

Labor productivity increased in the sector by 7.4 percent, including by nearly 75 percent due to measures on the acceleration of technical progress.

Under the conditions of the experiment the indicators of product quality increased substantially at the enterprises of practically all sectors. Thus, in the Ministry of Heavy Machine Building in 1984 the share of products of the highest quality category in the volume of commodity production came to 38.8 percent, while during the preceding year it was equal to 35 percent. This share came to more than 48 percent at the enterprises of the Ministry of the Electrical Equipment Industry.

A substantial improvement occurred at the enterprises of the republic ministries, which are working under the conditions of the experiment. Thus, in the Belorussian Ministry of Light Industry the proportion of products of the highest quality category came in 1984 to 21 percent (during the preceding year--18.4 percent). In all 1,445 descriptions of products were certified for the State Emblem of Quality with a plan of 975.

#### The Stimulation of Designers and Process Engineers

The acceleration of scientific and technical progress is the affair of not only enterprises which ensure the output of products. It is important that the scientific subdivisions of production associations would actively participate in this process. It is an extremely important matter to increase their interest and responsibility in the acceleration of the development of new equipment, its introduction in life and the decrease of the expenditures on scientific research.

The general problem, which is being solved in the economic experiment, namely the fulfillment of the set amount of work with fewer personnel, the increase of the combining of occupations and positions and the achievement on this basis of higher results of labor, remains urgent as applied to the scientific, design and technological organizations of production associations. Along with this in the scientific research subdivisions it is exceptionally important to ensure the increase of the skills of staff members and the more intensive use of their labor. The reserves in this matter are enormous.

In order to increase the creative activeness of designers, process engineers and other engineering and technical personnel and to increase their material interest in the performance of operations with fewer personnel with a high technical level and quality of developments, since 1983 an economic experiment has been conducted on the increase of the stimulation of design and technological organizations in the Izhorskiy zavod, Leningradskiy metallichесkiy zavod, Nevskiy zavod, Elektrosila and Leningradskiy elektromekhanichесkiy zavod production associations.

As is evident, several enterprises belong to the sectors which are working under the conditions of the economic experiment on the broadening of the independence and responsibility of enterprises. In 1984 the conducting of the experiment was begun at several more enterprises, among them is the Uralmash Production Association. Since early 1985 the indicated system has been introduced at nearly 40 more associations of the country.

The experiment on the increase of the stimulation of design and technological organizations should become a most important component of the overall mechanism of the improvement of management at the level of enterprises and production associations. Therefore, this question requires thorough examination. During the conducting of the experiment at design and technological organizations a system, which ensures the great dependence of the wage of workers of these organization on the results of their labor, is being tested. This system is a component of the measures on the broadening of

the independence and responsibility of enterprises. Its essence consists in the following.

1. A permanent wage fund (as a rule, for 3 years) is approved for design and technological organizations and subdivisions, on the basis of the number of workers in accordance with the manning table at the beginning of the experiment. This is an important starting point of the entire system.

The procedure of determining the wage fund is stipulated. It has been established, in particular, that the amount of the actually established salaries and increments is included in the fund, but at the same time it should be reduced by the amounts of the payments, which are not connected with the results of labor (for example, for temporary disability). During the next period the wage fund can be changed, but this is done strictly in accordance with the standard, which has been approved by the ministry, and only in case of a change of the planned amount of scientific research, experimental design and technological work.

2. Assignments on the increase of labor productivity, which are expressed in the indicator of the standard net output, are established for the organizations which are participating in the experiment. It is stipulated that in case of the freeing of a number of workers as a result of the conducting of the experiment this assignment and the wage fund should not be adjusted. In contrast to the general procedure an assignment on the reduction of the number of administrative and management personnel is not established.

3. During the conducting of the experiment the rights of organizations in the use of the saving of the wage fund, which was obtained as a result of the freeing of a number of workers, have been broadened. In particular, it is permitted to establish the salaries for process engineers at the level of the salaries of design engineers of the corresponding categories.

Under the conditions of the experiment the observance of both the average salaries according to the salary schedules and the ratios of the size of individual categories of workers is deemed optional. This means that the management of an organization can now settle itself the questions of the number of workers in each section and the amounts of the salaries established for them.

Salary increments can be established for the engineering and technical personnel who are directly engaged in the development of new highly efficient equipment and technology. Here the skills of the workers and the degree of their participation in new developments are taken into account. The increments are paid by means of the saving of the wage fund. For designers, process engineers and other specialists the increments are established directly by the managers of the subdivisions and are submitted for approval to the general director of the association, for the managers of the subdivisions--by the general director. The amounts of the increments are not limited. Just as at other enterprises and organizations, the increments are canceled in case of the worsening of the indicators of work.

The use of salary supplements for the combining of occupations is being expanded significantly. The fact that the supplementary payments are not limited, as a rule, to 30 percent of the salary, as happens at other enterprises and organizations, is new.

The system of the payment of bonuses to workers is being revised in principle. It is important that under the conditions of the experiment the greater differentiation of bonuses is being ensured. It is well known that in the prevailing model statutes the bonus is credited to all the workers of the subdivision and then can be increased or reduced for individual people. Such an approach, as practical experience shows, results in much leveling in the payment of bonuses and the aspiration to pay it to everyone, regardless of the labor contribution. Under the conditions of the experiment the bonus is paid only to those designers and process engineers who have made a significant contribution to the solution of the problem posed to the subdivision.

The collectives of design subdivisions "earn" the wage (including bonuses) and distribute it on the basis of the coefficient of labor participation. The director of the organization can increase the amounts of the bonuses from the wage fund for the workers of pilot works, who fulfill difficult and responsible assignments. This bonus can amount to 60 percent of the wage rate.

Thus, the new, broader rights in the use of salaries and the stimulation of workers are making it possible to differentiate the wage more and to connect it more closely with the actual results of the labor of each person.

4. For the more thorough and comprehensive evaluation of the labor of the designers and process engineers, who are working under the conditions of the experiment, it is envisaged to carry out the certification of workers, as is customary in independent design and technological organizations. However, the certification will be carried out not by a show of hands, but by secret ballot, and its periodicity is once in 3 years.

The experiment received endorsement at the associations where it is being conducted. Special commissions for the organization of the work have been set up everywhere. Much preliminary educational methods activity has been conducted; organizational and technical measures, which are aimed at the increase of the technical level of designs and their quality, the decrease of the number of workers of the subdivisions and the increase of the responsibility of people for the assigned job, have been elaborated and are being fulfilled.

The first results of the work under the new conditions already show that significant positive changes have occurred at the associations. For the 5 associations of Leningrad in the first 10 months about 11 percent of the permanent number of personnel were released. During this time about 30 percent of the workers received wage increments and supplements.

It is very important that already during the first year of the conducting of the experiment a substantial increase of labor productivity was achieved at all the associations--as a rule, 10-14 percent. Here the optimum ratio

between the increase of the wage and labor productivity is being ensured. A decrease of the time of the performance of operations and an increase of their quality are being noticed everywhere.

It is obvious that the experimental system of the remuneration of the labor of designers and process engineers is very promising and is contributing to the solution of many problems which face design and technological organizations. Consistent work in this direction is making it possible to increase the interest of engineering and technical personnel in the results of work, which will contribute to the increase of production efficiency and the acceleration of the introduction of the achievements of science and technology.

At the Leningrad Elektrosila Association in 8 months of 1984 approximately 9 percent of the permanent number of designers and process engineers were released. At the same time salary increments were established for more than 1,000 specialists. It is important that during the experiment the right to differentiate the indicated increments is being exercised extensively: their amount actually ranges from 20 to 200 rubles.

Another lever--the increase of the salaries for specialists, who in accordance with the results of their labor have gained this right--is also being actively used during the experiment. More than 600 people obtained the indicated salary increase.

The extensive rights in the use of the saving of the wage fund were conducive to the fact that during the period of the conducting of the experiment the final indicators of the work of the association, as well as of the design and technological services increased. Here the total production volume was obtained without an increase of the number of workers.

The more efficient labor of designers and process engineers contributed to the fact that during the period of the conducting of the experiment the State Emblem of Quality was awarded for the first time to 14 new items. During the corresponding period of last year the Emblem of Quality was awarded to eight items. The qualitative characteristics of such items were also improved significantly.

The design documents for the most important items were drawn up before the set date. All the items being newly developed at the association, which are liable to certification, are being evaluated as being of only the highest quality category.

Socialist competition for the successful accomplishment of the assignments and obligations of 1985 and the five-year plan as a whole has now been actively launched at the enterprises. A creative search for reserves of production, the increase of labor productivity and the tightening up of the policy of economy is under way. And the basis of efficient development, Comrade K. U. Chernenko stressed at the meeting of the Politburo of the CPSU Central Committee on 15 November 1984, is the extensive introduction of the achievements of science and technology in production.

## Facts and Figures

### Expenditures on Science From the State Budget and Other Sources (billions of rubles)

1980	1983	1985 (plan)
22.3	26.0	27.5

### Number of Assimilated New Types of Machines, Equipment, Instruments, Automation Equipment, Materials (thousands)

1980	1984	1985 (plan)
3.7	about 4	4.2

### Number of Obsolete Designs of Machines, Equipment, Apparatus, Instruments and Automation Equipment, Which Were Removed From Production (thousands)

1980	1984	1985 (plan)
1.8	2.2	2.4

### Developed Automated Control Systems of Technological Processes of Production

1980	1983	1985 (plan)
395	527	about 800

In the State Plan of USSR Economic and Social Development for 1985 500 assignments on the introduction of advanced technological processes and means of the mechanization and automation of production are envisaged.

The use of advanced resource-saving technologies, including such ones as the continuous teeming of steel, the production of cement by the dry method, more thorough petroleum refining and gas processing and the complete use of raw materials, will be expanded.

In the machine tool and tool building industry the output of NC machine tools and robotized press complexes will increase by 1.3- to 1.5-fold.

About 1,150 computer control complexes based on miniprocessors for the automation of machines, equipment and instruments will be put into operation.

In all 4 hours are allotted for the study of the third theme, including 2 hours for a seminar and a practical class. The goal of the class is to study the possibilities and to outline specific means of the rapid introduction of the achievements of science and technology, the better use of the production development fund and the increase of its role in the technical improvement and retooling of your association (enterprise). Special attention should be devoted to the questions of the improvement of the quality of the output being produced and the improvement of the stimulation of the development and production of items which correspond to the best world and domestic models.

The preparation and defense during the classes of papers will help the students to better master the theme.

THEIR APPROXIMATE THEMES:

1. THE DRAFTING OF THE ANNUAL AND LONG-RANGE PLANS OF THE RETOOLING OF THE ASSOCIATION (ENTERPRISE).
2. THE FORMATION AND THE USE OF THE ASSETS OF THE PRODUCTION DEVELOPMENT FUND AT PRODUCTION ASSOCIATIONS (ENTERPRISES) UNDER THE CONDITIONS OF THE ECONOMIC EXPERIMENT.
3. THE ANALYSIS OF THE ECONOMIC STIMULI OF THE INCREASE OF PRODUCT QUALITY AT THE ASSOCIATION (ENTERPRISE) UNDER THE CONDITIONS OF THE ECONOMIC EXPERIMENT.

The acceleration of scientific and technical progress and the extensive and rapid introduction in production of the achievements of science and technology are an important factor of the success fulfillment of the plan assignments and socialist obligations of 1985 and the five-year plan as a whole, the increase of production efficiency on the basis of its intensification and the formulation of scientifically sound Intensification-90 programs and plant five-year plans of intensification for 1986-1990.

From the Statute on the Formation and Use of the Production Development Fund for the Ministry of Power Machine Building

The production development fund at production associations (enterprises) is formed on the basis of the amounts of this fund, which has been determined in accordance with the plan of the base year, and the sum of the increase of the fund, which has been calculated according to the standards for each percent increase of the profit as compared with the base year, and the amortization deductions for the complete replacement of the fixed production capital.

Here the planned amount of the production development fund for the production association (enterprise) for 1985 cannot be less than the amount which corresponds to the share of these amortization deductions for the production development fund, which formed for the ministry as a whole in accordance with the plan for 1984.

The planned production development fund for the ministry as a whole for 1985 is determined according to the sum of the planned funds of the production

associations (enterprises), which were formed in conformity with the procedure presented above.

The adding to the production development fund is accomplished first of all by means of the amortization deductions, which are intended for the complete replacement of the fixed production capital, while in the remaining part it is accomplished by means of the profit.

The receipts from the sale of retired property, which is reckoned in the fixed capital, less the expenses connected with the liquidation of this property, and the receipts from the culling of livestock are also channeled into the production development fund.

The standards of the increase of the production development fund, which is formed by means of deductions from the profit and the amortization deductions, which are intended for the complete replacement of fixed capital, are approved in the five-year plan in accordance with established procedure.

The ministry can establish for individual production associations (enterprises) higher standards of the deductions for the production development fund with allowance made for the degree of wear of the fixed production capital.

The standards, which have been established in the five-year plan, are not liable to change and reapproval.

The absolute amount of the production development fund for the production association (enterprise) is specified in the five-year plan (with a breakdown by years) in accordance with the standards established for it.

The planned amount of the fund for the corresponding period (quarter, half a year, 9 months, a year) is increased (decreased) by the amounts, which have been obtained by multiplying the actual percent increase of the amortization deductions, which are intended for the complete replacement of the fixed capital as against the amortization deductions envisaged for the corresponding period in the financial plan, and the actual percent increase (decrease) of the profit as against the corresponding period by the corresponding standards of the increase of the production development fund and the value of the indicated fund-forming indicators in the plan of this fund.

The calculation of the deductions from the profit for the production development fund during the year is made quarterly in accordance with the results of the work for the past period since the beginning of the year by a cumulative total (quarter, half a year, 9 months, a year). Previously made deductions are subtracted.

In case of the nonfulfillment of the plan of the profit the production development fund is formed in accordance with established procedure in a reduced amount. Here the minimum amount of the production development fund cannot be less than 40 percent of the planned amount of the fund during the period in which the nonfulfillment of the plan was allowed. The amount of the production development fund (including the minimum deductions during

individual quarters), which is formed by means of the profit in case of the nonfulfillment of the plan of the profit since the beginning of the year in a cumulative total (quarter, half a year, 9 months, a year), cannot exceed the sum of this part of the fund, which is envisaged in accordance with the plan for the corresponding period.

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CSO: 1814/120

BIOGRAPHICAL INFORMATION

NIKOLAY IVANOVICH KHITAROV OBITUARY

Moscow IZVESTIYA in Russian 8 Feb 85 p 6

[Article: "N. I. Khitarov"]

[Text] Corresponding member of the USSR Academy of Sciences Nikolay Ivanovich Khitarov, an eminent scientist in the field of Earth sciences, has died.

The announcement of the death is made with deep regret by the Presidium of the USSR Academy of Sciences, the academy's Department of Geology, Geophysics and Geochemistry, and the academy's Institute of Geochemistry and Analytical Chemistry imeni Vernadskiy, and sincere condolences are expressed to the family and friends of the deceased.

CSO: 1814/144

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17 July 85